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The effects of the unexpected cautionary and annual earnings announcements on the Price Formation Process: Evidence from the JSE

By

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Abstract

Certainly, a decision to (dis) invest (buy/sell) in securities is largely influenced by future expectations to which in turn is informed by the fundamental analysis of historical prices. The investor supposedly extrapolated on the historical prices if below the mean you buy and vice versa. The average security prices must be the product of the passing of time but most importantly the direction must be susceptible to a particular point in time. Investor decision-making involves a selection of a combination of the individual security characteristic with the market sentiment (bearish or bullish). The market sentiments are measured on time passed, ie market prices are either higher or lower relative to historical prices and the investor holding period wish. Valuation is nothing but a timing exercise to which the future perspective is forged on the future outlook of both micro and macro-economic factors. The valuation is relative to a true return generating process for a 'true' single security market portfolio, ie expected future earnings. The occurrence of 'unexpected earnings' creates an expectation of above 'true' market portfolio returns, ie abnormal returns (ARs). This study is premised on the appreciation and understanding of the manifestation of a 'true' single stock market portfolio.

The study presents the analysis of the contemporaneous association of unexpected earnings also referred to as cautionary earning or 'earnings surprise' published in the Trading Statement releases (hereinafter referred to as 'releases') and security price movement. This research study is the second to investigate, at least to the researcher's knowledge after Cata (2015), the entire price formation process on the effects of unexpected cautionary and annual earnings announcements on security market prices of the JSE listed**.** Firstly, the expectations are that security prices adjust immediately to earnings and /or price-sensitive market information when made public. Secondly, since earnings information is fully impounded onto security prices a not statistically significant ARs are earned on and around the disclosures. Lastly, no statistically significant cumulative abnormal returns (ie CARs) post-earnings releases and announcements (ie PEADs) and any non-random security return drift indicate a level of inefficiency.

The study adopted a return based unexpected earnings measures or model of Foster, Olsen and Shevlin (1984), and Van Rensburg's (2002) two-factor Arbitrage Pricing Theory (APT) to be a factor analytic procedure for assessment of a true return generating process for a 'true' single stock market portfolio.

The empirical evidence suggests investors revise the security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) percentage before an unexpected earnings announcement. This observation strengthens the argument that other timelier sources of information are already factored into share price prior to unexpected earnings releases.

An alternative argument on legitimate information dissemination and other timelier sources of information provides a compelling argument for an all-encompassing multi factor-model in the context of JSE. According to Dr. Holman (2018[1]) a measured or weighed multi factor-model consisting of a metal index, interest rate (ie 5 or 10 years repo rate), inflation rate, currency, beta, economy (ie GDP growth), stock size (small vs large capitalisation), leverage, unemployment rate, values such as price to book value or price-earnings (P/E) ratios, momentum (market biases – a big thing). Perhaps this to provide an explanatory power or rationale of the full market reaction when all price-sensitive factors are considered at once and rated accordingly is to explain the extent of the usefulness of the market information from a piece of specific unexpected event news. In so doing provide for an opportunity to improve on the true return generating process for a 'true' single stock market portfolio from Van Rensburg's (2002) two-factor Arbitrage Pricing Theory (APT).

The study's results come from an observation of five unexpected earnings models or measures and the trading statement news sign and size to ascertain the size of the security price movement and return drift. The evidence gathered is conclusive concerning the association of the information content generated through unexpected earnings disclosures and the average CARs and their t-statistic test found to be significantly different from the theoretical or expected zero return. However, the outcome of t-statistic tests is not statistically significant at a 5% significance level of significance over the observation period, therefore, they cast doubt on the use of the initial response to consistently earn earnings above average normal returns.

The study observed a security price movement in line with 'good' and 'bad' news portfolios on [-3; -1] and [-1; -1] releases and [-2; -1] announcements in support of Kornik's (2005) observation of a significant portion of the market reaction occurring in the two days prior to the announcement date. Kornik (2005) suggests that either a substantial information leakage or simply legitimate information dissemination and /or anticipation (ie from other timelier sources of information) allows for investors to correctly adjust their earnings prediction through

[1] From the lecture notes

company analysis and /or interviews with management prior to unexpected earnings announcements.

This study conclusion is that there is evidence of significant association to suggests an investor reassessment of their beliefs/expectations on the occurrence and the size of 'earnings surprise' and unexpected annual earnings. The finding violates the Efficient Markets Hypothesis (EMH) which assumes that security prices are instantly and fully reflective of all available information and that investors cannot use public information to consistently gain above-normal returns (Cata, 2014).

It important to highlight that, contrary to Murie's (2014) and Cata's (2015), the study found no suggestion that investors wait to determine the uncertainty regarding the specific reason for the change in earnings on the releases date to be alleviated via the announcement or publication of actual earnings to conclude on inconsistencies observed with semi-strong form market efficiency. First and foremost a conclusion must be reached based on significant abnormal returns earned on the market news in periods surrounding earnings releases and announcements strengthened by the outcome of the unexpected earnings measures or models. Secondly, Murie (2014) correctly pointed out that unexpected earnings models or measures are not an information source to the market, unlike trading statement releases or earnings announcements. Thirdly, Murie (2014) did not investigate the entire price formation process and his [+3;+60] post-release would have included the effects of earnings announcements considering that on average it trails by approximately 9 trading days from the releases. What is known based on this study observation and Kornik's (2005) assertion is that new information should be impounded into the security price within a week (ie 5 days on average) of the announcement.

The significant price movements appear to be taking place on intraday releases, previous studies show that the focus was only on closing and opening security prices. The observed price movement prior to, on the event date and after the release date supports the findings of Ball and Brown (1968) that the market uses other timelier sources of information available in the market to revise share valuations (Murie, 2014). However, the unexpected earnings are partly timely to the extent of approximately 15 to 10 (Ball and Brown, 1968) and /or 15 to 2 percent (Kornik, 2005) resulting from investors' revision of the security valuations to between 85 to 90 percent (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) percent before an unexpected earnings announcement. The researcher's view is that, since the expectations, in most cases, are influenced by the analysis of previous earnings announcements, the actual results and analysts' estimation, therefore, to a certain extent the price movement reflects the

evolution of the investor/market sentiment and overtime change in earnings is judged in this context (i.e reaction).

At this point, it is advisable that future research looks into or considers subdividing the releases into voluntary (ie management forecast) and compulsory release (i.e regulatory requirement since 2010) as the latter appears to influence the extent of investors' response.

Declaration

Apart from the assistance which is acknowledged and the quotations which are specifically referenced in the text and bibliography section of the research, this thesis is entirely my work and not being submitted for degree purposes at any other university.

By submitting this research report electronically, I, Mandla Stephans, declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly stated otherwise) and that I have not previously in its entirety or part submitted it for obtaining any qualification.

Mr. Mandla-Kayise Stephans

February 2020

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Last, but not least, to a child, Ave-Tandwa Stephans (D.o.b: 2010/09/16), ever since then, I have been able to appreciate the value of reading and lifelong learning.

All mistakes are mine.

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CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

The primary focus of this study is on the analysis and assessment of the market reaction to and the duration of the effect of the firms' unexpected earnings on security price of FTSE/JSE Top 40 constituents of the South African (SA) Johannesburg Stock Exchange (JSE).

The listed security return is measured by the movement in market security prices covering periods from January 2014 to March 2019. For this study, the JSE Financial-Industrial and Resource indices are used as observable market proxies, identified by the JSE codes FIND30TR and RESI20TR, to measure the market return. The study employes a two-factor Arbitrage Pricing Theory (APT) as the true return generating process for a 'true' single stock market portfolio. The study has adopted a return-based unexpected earnings measures or model of Foster et al. (1984) and Van Rensburg's (2002) two-factor Arbitrage Pricing Theory (APT) factor analytic procedure as the true return generating process for a 'true' single stock market portfolio.

There is a strong argument that favors consideration of several 'priced' factors that cause or create the movement of the market share prices (Dr. Holman, 2018). The multiple-factor risk model consists of industry factors and risk indices. The 'priced' factors must be reduced to priority factors consisting of at least three categories, namely: responses to external influences, cross-sectional comparisons of asset attributes and purely internal or statistical (Dr. Holman, 2018). The trading statement releases contain most of these factors broadly classified as micro and macro-economic factors.

The selection process of the research paradigm (such as established measures of models), methodology, hypotheses, and data are discussed in detail below in chapters 3, 4 and 5, respectively. It is important to note that this study does not purport to investigate the form of JSE efficient market hypothesis (EMH), however, the analysis is instrumental in forming an opinion or viewpoint to determine whether JSE is indeed a weak or semi-strong form of market efficiency.

The problem question is whether or not the unexpected earnings generate new and sufficiently material information for the market to cause investor reaction in seeking to integrate this information into security price. The market reaction is premised on the rationality and

competitive behaviour of market participants to cause security price or asset valuation to consistently and continuously adjust to reflect all new price-influential information.

Beaver, *et al.* (2005), provides an example of legal disputes relating to financial statement reporting, how much of the stock price would have been affected had the company released its 'correct' earnings in place of allegedly inflated earnings. The compulsory releases are regulatory mechanisms in monitoring the market activities within JSE to minimize the possibility of abnormal profitable arbitrage opportunities within the stock market (Phiri, 2015).

Cornell and Landsman (1989) argue that the unexpected increases in earnings are associated with a rise in stock prices, while the unexpected decreases in earnings are associated with a fall in stock price. The unexpected earnings are classified into 'good' and 'bad' news portfolios according to the sign of trading statement releases. To the extent that the unexpected earnings announcement is unanticipated and the content therein could not have imagined or was unforeseeable by the market participants, as such, they are likely to provide new information.

In the context of other timelier sources of information, Imhoff and Lobo (1984), stated that analyst forecasts complement the management forecasts in those periods when management publicly releases forecasts and acts as substitutes in periods when management does not issue public forecasts. According to Kornik (2005), analyst forecasts are a more accurate measure of expected earnings than prior-year earnings.

1.2 APPROACH TO THE STUDY: EVENT STUDY METHODOLOGY

The security return is examined in four distinct periods modified from Das, Kim and Patro (2007) and Cata (2014) observation period, namely:

(i) At the trading statement release date;
(ii) At the period subsequent to the trading statement releases and preceding the actual earnings announcement;
(iii) At the time of the actual earnings announcement; and
(iv) At the -5 to +5 days period surrounding the cautionary and annual earnings announcement.

The proposed research study is to examine the following key elements in the price formation process;

- effect of voluntary and/ or compulsory management profit forecasts disclosure's on the issuer's referenced listed security price.
- effect of management profit forecast disclosures on the direction of good' or 'bad' news portfolios and size of the security price movement of the issuer's referenced listed security price.
- duration of effects and direction of the security price movement of the issuer's referenced listed security price post unexpected earnings disclosures.

1.3 PROBLEM STATEMENT/PURPOSE OF THE STUDY

1.3.1 Purpose of the study

This study aims to investigate the entire price formation process resulting from the effects of unexpected cautionary and annual earnings announcements on the security market prices of the JSE listed companies.

An important attribute of JSE semi-strong form market efficiency is that the effects of publicly available information are fully reflected on security prices. The security prices adjust immediately to reflect the anticipated events newly generated information making it almost impossible to earn above-normal returns and to forecast future price variations

The main purpose of the study is the analysis and assessment of the anticipated market reaction and observe the duration of the effect of the firms' cautionary and annual earnings announcement on the JSE top40 issuer's listed securities price.

1.3.2 Research questions

Primary research questions are as follows:

- Is there any association between the unexpected earnings or 'earnings surprises' conveyed through trading statement releases and earnings announcement on the issuer's listed securities prices and the prediction of the future return generating processes?

Secondary research questions and /or problems are as follows:

- Is there any association between the ‘good’ and ‘bad’ news portfolios based on the sign of the trading statement release and the security price direction or movement prior to, on, and after the release and announcement date?
- Is the duration of the effects of the anticipated events and the subsequent newly generated information on the security price movement lead to an investor's potential earnings of above-normal returns?

1.4 THE RESEARCH SCOPE OF STUDY

The study’s research scope is limited to the observation of the future return generating processes on and around five to plus five days period surrounding the unexpected earnings or 'earnings surprises' releases and annual earnings announcement. The collected data from the SENS database on IRESS (ie McGregor BFA) are in respect to trading statement releases, earnings announcements and security prices from the period of January 2014 to March 2019. The scope of the study to include:

- **Chapter 1:** provides a background to the study research
- **Chapter 2:** provides for the theoretical framework that supports the theory of the research study through conducting the prior empirical literature reviews on Efficient Market Hypothesis (EMH), Arbitrage Pricing Theory (APT-model) and Capital Asset Pricing Model (CAPM).
- **Chapter 3:** conducts an empirical literature review on the informational content of accounting income numbers, security return and anticipated events of more other timely sources of information.
- **Chapter 4:** outlines the research paradigm, methodology, hypotheses, data and study event approach.
- **Chapter 5:** outlines the selection criteria for the firm’s inclusion into the sample, data sources, collection information collection process and limitation.
- **Chapter 6:** analysis the empirical results and discuss the research findings.

  Chapter 7: provides for a study conclusion and recommendations on potential further research.

1.5 MOTIVATION FOR THE STUDY

The main motivator for this research is to contribute and to strengthen the recent related literature to see if this study will come to a similar conclusion, albeit using, a variety of research methodology. The market sentiments and business confidence has changed in recent times marked by state capture-related allegations, corruption both in private and public sectors, Nene-gate saga and external pressures from rating agencies to global uncertainties.

The desired outcome could be robust as the researcher in this study covers a complete separate period compared to that of Murie (2014) and Cata (2015), the researcher also addresses some of the shortcomings from sample size to testing for the violation of semi-strong form market efficiency.

As indicated in the previous section, it appears as if this is the second study to be investigated, at least to the researcher's knowledge, after Cata (2015), the entire price formation process on the effects of unexpected cautionary and annual earnings announcements on security market prices of the JSE listed

The key shortcoming of these event studies' are, including but not limited to, the curious observation of the tendency to treat market events in isolation from each other when assessing their effects on the security price. Meaning the treatment of the market events is separated as if far apart from each other. A consented effort to investigate any price movement prior to the unexpected earnings suggesting an information leakage of material and non-public information.

CHAPTER 2
THEORETICAL LITERATURE

2.1 EFFICIENT MARKET HYPOTHESIS

2.1.1 Background

This chapter provides for the theoretical framework that supports the theory of the research study through conducting the prior empirical literature reviews on Efficient Market Hypothesis (EMH), Arbitrage Pricing Theory (APT-model) and Capital Asset Pricing Model (CAPM).

An efficient market must then mean market participants or rather the participation of a substantial number of investors or traders, i.e market reaction – a rational and competitive behavior, a substantial and collective move based on the sign and size of news in their endeavour of profit-seeking upon participants accessing and consuming the newly available information or unexpected event news. The rationale shows that there is a consensus on the nature of information (ie new and unexpected) and competitiveness (ie promptly, therefore, opportunistically) to mean it is seen as an opportunity to profit.

The security price adjusts quickly to represent the current (no future misalignment of expectations) market consensus or expectations (ie timely reaction to what is known now or expectations of what is known now to continue in a certain direction). Present security prices represent the market's expectation of future cash flows and growth (Swart & Hoffman, 2013) and it must be based on what is known now informing rational expectations of future security return. If not based on that then the market is speculative on future cash flows and growth.

An anomaly (i.e inconsistency to what is rational or accepted or expected) refer to the market's or investors' inefficient response – insignificant reaction to unexpected event news such as new information but occurs only if on average investors are rational and competitive (i.e consistent in observing and acting on market opportunities such that the ultimate goal of profit-seeking is achieved).

The essence of what becomes of this study depends on what transpires following the notion of rationale and competitiveness of the market (i.e efficient markets assumption) and the existence of arbitrage opportunities upon efficient disclosure of unexpected event news.

The Efficient Market Hypothesis (EMH) presupposition is that the security price materially reflects the newly available information (Fama, 1991) from a variety of [timely] forces (Langevoort, 1992). This study's fundamental theme is to test the central insight that a variety

of [timely] forces impound available information into security prices fast enough that arbitrage opportunities cannot be exploited systematically (Langevoort, 1992).

According to Beaver (1972) the capital market efficiency and the content of information contained in the accounting data can be inferred by observing security prices and volume reaction to announcements of these data. An economist, Michael Jensen (1978), argues that EMH is the most empirically sound economic proposition. However, Lo and MacKinlay (1988) hold a different view, they are of the belief that prices do not follow a random walk and witness a general reluctance to reject the notion of market efficiency.

In an efficient market, costless or less costly information is not only a sufficient but necessary condition for prices to fully reflect all available information (Grossman and Stiglitz, 1980 and Fama, 1970). However, Hayek (1945) believes this is irrational in the sense that price systems and competitive markets are important only when information based on is costly. In addition, Grossman and Stiglitz (1980) argue that cost less or less costly information must be precisely consumed by informed traders to form an equilibrium. Only then the security price fully reflects the market sentiment at a particular point in time of a rational and competitive investor.

To summarise the EMH, a weak form is when historic information is fully reflected in security prices. The semi-strong form is when the security prices efficiently (ie speed and accuracy) adjust to reflect publicly available information. The strong form is when security prices fully reflect all available information (ie public and private) relevant for price formation in which no monopolistic access (ie efficient disclosures) by concerned individuals and/ or institutional investors (Fama, 1970).

Similar to Murie's (2014) and Cata's (2015) empirical research attempts to validate the semi-strong form of the EMH which is ongoing. This research attempts to contribute to this ongoing effort of investigations and tests on how quickly and accurately the unexpected event news and publicly available information is incorporated into security prices.

Furthermore, Kruger (2011), states that the EMH is closely related to the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and the Arbitrage Pricing Theory (APT) of Ross (1976). Therefore, this study considers both APT-model and CAPM and employs broad market indices as proxies for the assessment of a true return generating process for a 'true' single stock market portfolio.

2.1.2 Challenges to efficient market theory

The main challenge to inferences about market efficiency is the joint-hypothesis problem and is more serious (Fama, 1991). He further claimed that the market efficiency per se is not testable unless tested jointly with some model of equilibrium, for example, an asset pricing model. According to Fama 1970 to test whether the information is properly reflected in prices, it must be done in the context of a pricing model that defines the meaning of 'properly'.

There are various benchmark return models available for consideration in the determination of the abnormal return (ie unexpected returns) such as the capital asset price model and arbitrage price theory model to determine an expected return. In the next sections (2.2 and 2.3), the study discusses the CAPM together with the APT-model in the calculation of 'expected return' herein referred to as 'benchmark return'.

The rationality of the investors is very critical to the efficient market theory. The assumptions underlying the efficient market hypothesis (EMH) are that of the availability of information and the rationality of the market, i.e. prices respond immediately to new information (Murie, 2014).

Shleifer (2000) elaborates further, that the basic theoretical case of EMH is informed by three arguments that rely on progressively weaker assumptions. Namely, (1) investors are assumed to be rational, (2) to the extent that some investors are irrational, their random trades cancel each other out without affecting prices. And, (3) the irrational investors are met by market rational arbitrageurs canceling out their influence of prices.

The EMH does not live and die by investor rationality, adds Shleifer (2000). He argues, if irrational investors are in large numbers and their trading strategies are uncorrelated, trades cancel each other out. He concludes that when investors are not fully rational, not trading in large numbers and their strategies are uncorrelated, the market is still predicted rational (Shleifer, 2000).

2.1.3 Test of semi-strong efficiency

The test for market efficiency consists of any observable patterns in security returns (ie technical analysis) and market responses to new and therefore current (ie speed and accuracy) information (fundamental analysis). In addition, any observable investors' reaction two days prior to the unexpected event could suggest an information leakage of material and non-public information (Kornik, 2005 and Cata, 2015).

The test for focuses on the direction and size of 'good' and 'bad' news portfolios in and around unexpected event news of [-2; +2], [-2; +0], [-2; +1], [+0; +1], [+0; +2] unexpected earnings model or measures and /or days variation and a drift of [1; +2] and [3; +5] window period. The test measures the immediate effects of published information reflected in the releases and earnings announcement on the security prices. The test conducted to provide evidence of the direction and size of CARs, return drift and whether it significantly different from zero or approximately equal to zero during the window period (ie H_0: AR = 0 or AR ≠ 0). In a semi-strong form of the efficient market, the security prices adjust instantaneously to new information rendering post news drift non-existent, ie H_0 : AR = 0 (Murie, 2014).

Titan (2015) asserts a similar view, that in the case of the semi-strong form of EMH present on capital market neither technical nor fundamental analysis can determine how an investor would split his/her funds to obtain profitability that is higher than what would be achieved in case of investment in a random portfolio of financial assets.

If no significant price movement is observed, it will confirm that the current security prices materially reflect the newly available information (Fama, 1991) from a variety of forces (Langevoort, 1992).

2.2 ASSET PRICING MODEL

2.2.1 Capital asset pricing model (CAPM)

Although trading traditional models of investments provides some insight, however, the shortcomings are largely based on the conditions of certainty. The pervasive influence of risk led to the adoption of models of price behaviour that are more than just assertions, acknowledged by Sharpe (1964). This led to developing a model to predict the behaviour of capital markets to address the observed shortcomings of traditional models that contributed to mispricing through the introduction of positive microeconomic theories that deal with conditions of risk.

In testing for market rationality and to determine the capital asset prices, Sharpe (1964), began with a description of the process through which individual preferences and physical relationships interact to determine an equilibrium pure interest rate. Hereafter, a market capital line (also referred to as an efficient frontier of securities) asserts that if the investor follows rational procedures (ie primarily diversification) the desired point is attained along the capital market line (Sharpe, 1964).

In essence, the CAPM presents you two components of risk inherent in an asset (ie unsystematic or specific risk) that can be avoided and the systematic or non-specific risk that is common amongst all assets in the market (Sharpe, 1964). Sharpe's (1964) CAPM is a combination of Markowitz's (1952) effects and limits of diversification and Tobin's (1958) risk-free asset in the portfolio allocation. The risk of a single asset relative to the market portfolio (ie systematic risk) is measured by Beta. Expected returns according to CAPM:

$$[E(R_i) = R_f + B_i\,[E(R_m) - R_f]$$

Where:

$$B_i = \frac{\sigma_i\, r_{im}}{\sigma_m} = \frac{\text{cov}\,(R_i, R_m)}{\sigma_m^2}$$

Where:

- (R_i) is the expected return on asset.
- R_f is the return on the risk-free asset.
- $[(R_m) - R_f]$ is market risk premium.
- B_i is the security's non-diversifiable risk.

The above equation represents the security market line, therefore, holds the security or portfolio's expected return. Kruger (2011) pointed to several restrictive assumptions, firstly, simplified assumptions that don't normally hold in practice, secondly, it implies the existence of the measurable market portfolio comprising of all assets traded in the market. He further argues that although such portfolios might exist it is not practically possible to either identify or measure its composition, therefore, proponents of the CAPM are forced to employ proxies.

To conclude, in addition to mentioned restrictive assumptions, there are problems associated with CAPM such as being a one-factor model (ie beta), the correlation between two securities is closely related to the volatility or standard deviation and beta regardless of whether it is a financial, mining, or any other security types.

2.2.2 The arbitrage theory of capital asset pricing (APT-model)

Ross (1976) developed the APT model as an alternative to mean-variance CAPM introduced by Sharpe (1964) for explaining the phenomena observed in capital markets of risky assets. The mean-variance model (ie E_i and B_i) relationship of any asset, i, it's the expected or forecast return is:

$$E_i = p + \lambda b_i$$

Where:

- p is the riskless rate of interest.
- $\lambda = (E_m - p)$ is the expected excess return on the market.

$$B_i = \frac{\sigma_i r_{im}}{\sigma_m} = \frac{\text{cov}\,(R_i, R_m)}{\sigma_m^2}$$

Where:

- β is the beta coefficient on the market.
- σ_m^2 the variance of the market portfolio.
- $\sigma_i r_{im}$ is the covariance between the returns on the ith asset and the market portfolio.

According to Ross (1976) the restrictiveness of the assumptions that underlie the mean-variance model (ie E_i and B_i) led to an alternative theory of pricing of risky assets developed that retains many of the intuitive results. Roll and Ross (1980) stated the APT-model that demonstrates the market equilibrium is consistent with no-arbitrage profit. Therefore, the CAPM is derived from a market equilibrium argument, whereas, APT-model is derived from an arbitrage argument (Van Der Merwe, 2016).

Kruger's (2011) view under the APT-model is that the correction of mispricing requires a small number of investors to restore equilibrium prices. Consistent with no-arbitrage profit (Roll and Ross, 1980) investors will react immediately to any possible arbitrage, therefore, enabling investors to take a riskless and costless position that takes advantage of the mispricing.

Accordingly, Van Rensburg, Slaney and Hardy (1997) motivated that a two-factor APT-model incorporating the JSE FINDI (J250) and the JSE Mining Index (J258) as factors provide for a superior account of the way assets are priced on the JSE compared to the traditional CAPM of Sharpe (1964), Lintner (1965) and Mossin (1966). The APT-model can be formulated as follows:

$$E(R_i) = R_f + B_{j1}\, R_{mt1} + B_{j2}\, R_{mt2} + \ldots.. B_{jn}\ R_{mtN}$$

Where:

- (R_i) is the expected return of security j.
- R_f is the risk-free rate.
- B_{j1} is the sensitivity of the jth asset to factor 1, this is also called factor loading.
- R_{mt} is the risk premium of factor 1.

Grinold and Kahn (2000: 173) and Kruger (2011) arguest that an APT model provides for an explanatory expected model of asset returns that are not constrained by the identification of a market portfolio, it does not in itself identify the priced risk factors that influence asset returns. It is for this reason that the APT-model is called an "arbitrary" pricing theory (Grinold and Kahn, 2000: 174). Grinold and Kahn (2000: 173) concluded that the APT model is an interesting and powerful alternative to capital asset pricing in comparison to CAPM.

2.3 CONCLUSION

This chapter provides an overview of the theoretical considerations according to which the effects of the information content of unexpected earnings events of JSE security returns can be analysed. This forms part of the development of the hypotheses together with the methodology used in testing for the proposed hypotheses to determine the effects of the unexpected earnings events on the price formation process of the JSE security price. Although, both CAPM and APT model employ proxies such as broad market indices for asset pricing in an attempt to approximate the market portfolio, the latter does not require the specification of a market portfolio and has fewer restrictive assumptions than the CAPM or assume that asset returns are normally distributed (Kruger, 2011).

CHAPTER 3
LITERATURE REVIEW

3.1 INTRODUCTION

This chapter conducts an empirical literature review on the informational content of accounting income numbers, security return and anticipated events of other timelier sources of information.

This study reviews key literature conducted on the efficient capital market hypothesis (EMH), consequently, investigations on the effect of the unexpected earnings on the share/security prices and whether any observation of significant abnormal returns. The study presupposition is that JSE resembles a semi-strong form of efficiency then if so the security prices adjust instantaneously to unexpected news events (Bhana, 1994).

This assumption is informed by Phiri's (2015) view that the literature presents conflicting evidence about the form of market efficiency more pronounced for developing and emerging. In the context of SA, an example of studies that provided conflicting evidence on the efficiency of SA market are Knight's (1983), Kornik's (2005), Mlambo and Biekpe (2007), Mlonzi, Kruger & Nthoesane (2011), Murie (2014) and Cata (2015), among others. Therefore, no expected relationship between the sign and size of unexpected earnings and that of ARs, and the security returns are not predictable subsequent to the news events.

This chapter provides for a broad overview of the international literature and emerging markets investigation of the decision-usefulness of the management forecasts (compulsory and voluntary) and unexpected annual earnings.

3.2 FINANCIAL AND ACCOUNTING DISCLOSURES ON THE FIRMS' VALUE

The rationale of an informationally efficient market is that at any given particular point no or insignificant private held information. In a semi-strong form of an efficient market, arbitrage profits are effectively eliminated. The demand for internally generated performance information helps to bridge any information gaps, therefore, to correctly measure the firm's performance and value, i.e price efficiency.

The disclosure of a firm's performance and going concern state are presented in the income statement (i.e performance), balance sheet (i.e position) and cash flow (ie financial strength and liquidity). The International Financial Reporting Standards (IFRS) produce higher earnings quality which tends to better reflect the firm's economic position and performance, consequently, shows a stronger association between security prices, earnings and book value. All of the financial and nonfinancial information is presented in the financial report which must consist of several disclosures relating to compliance with statutory and regulatory requirements, namely, Companies Act No.71 of 2008 and JSE listing requirements[2]. Investors rely on this information as an important input in assessing a firm's sustainability, prospects and value.

The security price-sensitive factors are broadly classified into micro and macro-economic factors, ie firms' specific events and other outside various issues (Holman, 2018). The focus of the study is on the rate of change in earnings disclosed in the unexpected earnings, however, the release statement consists of several macro factors, namely: commodity prices, foreign exchange movements, economic situation, currency devaluation, inflation and interest rate. And, other company-specific factors, namely: cost-saving initiatives, improved operational delivery, accounting policy (eg inventory gain – tax implications), capital expenditure, debt structure, interest savings, divestment, disinvestment, business model expansion, investment in new business, restructuring, infrastructure, exports and imports. The non-financial release disclosures are consistent with Dr. Holman (2018) a multi factor-model consisting of the metal index, interest rate (ie 5 or 10 years repo rate), inflation rate, currency, beta, economy (ie GDP growth), stock size (small vs large capitalisation), leverage, unemployment rate, values such as price to book value or price-earnings (P/E) ratios, momentum (market biases – a big thing).

The assessment of the intrinsic value of the firm's security emanates from the investor's examination of the disclosed micro and macro-economic factors. Accordingly, Grinold and Kahn (2000: 199) describe the modern theory as a basis for the valuation of security values to risk-adjusted expected cash flows or future sustainable earnings. Furthermore, the modern theory of asset valuation is generally conducted using a single factor (ie CAPM) (Sharpe, 1964) and multi-factor (ie APT) model (Ross, 1976).

[2] See (JSE Limited Listings Requirements. Instruction sheet, Second edition. Service Issue 14) for further reading

The market efficiency consists of price efficiency shown in the observable patterns in security returns (technical analysis) and information efficiency shown by the market responses (ie fundamental analysis). The investor uses this information is used to predict future profits/earnings to measure or calculate the true value of the security. Dechow (1994) found earnings to have a stronger association and correction with stock returns than net cash flows or cash from operations over short measurement intervals. This study focuses on the short-run investor reaction or adjusted of the expectation to unexpected earning disclosures.

In conclusion to the above discussion, there are several important factors around the unexpected earnings announcement that articulate the reasons behind security the price movement not only limited to a rate of change in earnings but other factors as well. It is therefore strongly believed that the multi factor-model provides for a great explanatory power on the direction and size of the market reaction in line with the 'good' and /or 'bad' news portfolio. This acknowledges that the market responses and/ or activities to timely sources of information about multi price-sensitive factors are to explain the duration and size of the effect of the unexpected event news on the security prices.

3.3 UNEXPECTED EARNINGS AND SUBSEQUENT PRICES FORMATION

The capital market efficiency, supposedly, provides for a framework upon which an understanding of the relationship between market information consumption and asset price valuation is to be investigated. Information efficiency must mean that market prices accurately and quickly reflect the new information. An investor must have quickly identified the market event news, correctly assessed the information in line with other timelier sources of information, and maximise his rational decision, supposedly, in line with the news sign. The capital market efficiency by definition must mean the information and price efficiency are a reflection of timelier sources of information. The capital market efficiency means the security return emanating from the market reaction to the extent of new and sufficiently material information in the context of other timelier sources of information. Therefore, the efficiency of the market is measured by the security return or price movement emerging from new and sufficiently material information, in the context of other timelier sources of information.

This definition is expressed in Fama's (1991) view that EMH, by implication, means the 'newly' available information is materially reflected in the security price. However, in Lev and Ohlson's (1982) view an investor must have shown a certain amount of interest, appetite and stance towards the 'new' information, hence, investor consumption patterns are tantamount to

security price movement. The security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) percent consist of the publicly available market information, while the rest is from privately held information, therefore, only the 'earnings surprise' is impounded into the security prices at the event date.

The study aims to answer the questions of (1) pre-release event price direction movement, (2) the extent of the effects of 'earnings surprise', (2) the association between release and /or earnings announcement to the security returns, (4) the period subsequent to release and /or announcement, ie the duration of the effects, and (5) to explain the association between the 'good' and /or 'bad' news portfolio of unexpected earnings and abnormal returns.

In conclusion, according to Lev and Ohlson (1982) consumption patterns or the market reaction are caused by the usefulness of the information or no use of the information at all. The selected literature, especially in the South Africa context, will assist in the critical analysis of the previously constructed and formulating of new hypotheses to discuss further under the research methodology and hypotheses chapter.

3.3.1. Earnings announcement and subsequent investor reaction

Kornik (2005) and Murie (2014) found the unexpected annual earnings to contain new information with a conclusion that "there is a portion of new information in the earnings figure". However, the issuance of interim reports and trading statement releases lack the significant market reaction suggesting that investors await confirmation from the earnings announcement. This to a certain extent is contrary to the view of Lev and Ohlson (1982) that the market reaction is caused by the usefulness of the information or no use of the information at all. Whereas or while market participants wait until the uncertainty with regards to the specific reasons on the information contained in the unexpected earnings to either be confirmed or disproved via the release of actual earnings announcements.

Perhaps a closer consideration of Dr. Holman's (2018) multi factor-model could provide explanatory power to prior unexpected event news security valuations to an extent of 85 to 90 percent (Ball and Brown, 1968) and 85 to 98 percent (Kornik, 2005). The rationale is that when all of these price-sensitive factors are considered at once and rated accordingly the market reaction or lack thereof will explain the usefulness of the market information from a specific market event news.

This phenomenon reinforces the view that the mere presence of the 'new' information but without or with limited usefulness or consumption through lack of substantial or sufficient

investor reaction could be an indication that the information is not entirely 'new' as it was partly captured in the previously published information. If so, the information efficiency oath to precede price efficiency, however, reinforces or validates the earlier.

This study is based on the premise that JSE listing requirements of the general disclosure obligation through trading statement release which excludes issuers that publish quarterly results from compliance with the detailed requirements of paragraph 3.4(b)(i) to (viii) (JSE Service Issue 14, 2011). Furthermore, the study investigates the immediate effect of unexpected earnings and whether it is sufficient to predict future returns given the state of information efficiency in the market and whether it renders abnormal returns of approximately zero.

3.3.2 Expectation and share price

This study does not test whether abnormal returns are significantly higher for firms meeting the market's expectation, ie measured in line with the analyst forecast model and /or unexpected earnings measures or models. According to Kornik (2005), the analyst forecast model produces a larger magnitude of abnormal returns, the analysts have the timing advantage of being able to incorporate recent information and having access to a wider base of information than the simple comparison of earnings.

In contrast to Kornik's (2005) view, what is logical is Foster's et al. (1984) return based unexpected earnings models that track security prices movement, which in turn is reflective of the market sentiment at a given point in time, therefore, a true reflection of information efficiency and it produces a better outcome that is reflective of price efficiency. The study seeks to determine the market's reaction to unexpected earnings news~~,~~ is a combination of meeting and /or exceeding the expectation, and measuring the duration and magnitude of the effect to the expected future earnings. The higher expected future earnings stem from a flexible and contextualised analyst forecast model that may have assigned a higher firm's valuation value to firms meeting expectations consistently. A multi-factor model (Dr. Holman, 2018) will resemble the characteristics of timing factors (ie rating of factors) and incorporating wider price-sensitive factors similar to analyst access to a wide information base.

It is important to provide clarity and be quick to acknowledge that expectations by definition are emotions and feelings absorbed and driven by the presence of a variety of factors that create a conspicuous concern, wish, knowledge and information.

3.3.2.1 Elton, Gruber and Gultekin (1981)

Elton, Gruber and Gultekin (1981) emphasized the view that investor expectations are based on the firm's and economic factors and determine the security prices. Lev and Ohlson (1982) present a contrasting opposite view that beliefs and expectations are determined and induced by security prices, ie price efficiency. Information efficiency must set in motion the investor's beliefs and expectations reflected in the security price movement and pattern. This perspective is somewhat supported by Beaver, *et al.* (2005) in that the reassessment of beliefs and change of expectations result in an investor reaction.

The researcher is of the view that it is important to concede that human occurrence does precede a specific market event of interest, in other words, the investor reaction is not necessarily resulted from a reassessment of the immediate firm and economic factors at the time of information release. This despite Firth's (1976) argument where he states that "we expect the stock market to re-evaluate the worth of the share, at the time of the release of accounting or financial information".

Elton, *et al* (1981) subject this to very little research examining expectational data and claims that the knowledge of earnings forecast cannot lead to an excess return because this information is already priced in. They argued that an investor earns excess returns when stocks are undervalued and you must possess the knowledge (ie information and skill) of the stocks that are due for greater revision. They conceded that there is very little empirical evidence to support the strength of this expectational data and the knowledge of earnings forecast. This is assigned to the measurement of the impact of expectations utilizing historical extrapolations of past data to serve as a proxy for expectational data. The discrepancies between historical and expectation data are formulated in the form of a misestimate in the consensus earnings forest (ie forecast error) as follows:

$$M_t = E_t - C_t$$

Then

$$\%M_t = \frac{E_t - C_t}{E_t}$$

Where:

- $\%M_t$ is the percentage forecast error at time t.
- E_t is reported earnings per share at time t.
- C_t is the consensus forecast for earnings per share s of time t.

Based on findings, collected data suggests that the share price is affected by expectations of earnings per share or accrual accounting and /or financial information.

3.3.3 Earnings and share price movement

Other noteworthy event studies[3] in explaining the extent of the usefulness of the market information from a piece of specific market event news. The event test and measures the degree of security prices adjustment to new information.

3.3.3.1 Michael Firth (1976)

Firth's (1976) empirical research focused on the value of the accounting information and to measure the impact on security prices in the United Kingdom (UK). The basic market model used, borrowed from the United States (US), to calculate the expected prices follows the Sharpe (1963, 1964) formula:

$$R_j = A_j + B_j R_m$$

Where:

- R_j is the expected proportionate change in the price of security j at time t.
- R_m is the proportionate change in a general index of share prices at time t.
- A_j and B_j are parameters estimated by the least-squares regression for each security j.

As time progressed different researchers agrees with the model's validity in offering satisfactory measurement techniques (Firth, 1976). However, the parameters of the market model for UK securities tested by Cunningham (1973) found the value of 'a' not statistically different from zero (Firth, 1976). Thus the following model (the variables as explained above):

$$R_j = B_j R_m$$

The market model used is a cross-sectional residual (ie prediction error) that measures the security price in the periods surrounding the announcement of the accounting and financial information (Firth, 1976). The cross-sectional cumulative impact measures the security price movement as a percentage of the expected security movement over the same period.

[3] Elton, Gruber and Gultekin (1981); Michael Firth (1976); and Ball and Brown (1968) & Ball and Kothari (1994)

Hereafter referred to as the Abnormal Performance Index (API) measure (adapted by Cata, 2015 from Ball and Brown, 1968):

$$API_M = \frac{1}{N} \Sigma_n^N \prod_m^M (1 + V_{nm})$$

Where:

- N is the number of securities.
- M is the end of the period (in months) over which the security is held.
- V_{nm} is the residual return of each security n in month m.

The market model prediction calculations were more accurate before the announcement. This prior announcement is critical in detecting any potential security return generation in the direction of the news sign. This captures the impact, if any, of information leakage or market anticipation of the unexpected event news before the release or announcement. However, from the event date (day zero) the residuals (ie prediction error) moves away from the expected value of zero. For 'good' news showed a rise of 2.1% from zero, ie, on average the security price rose by 2.1 % above the market mode predicted price.

3.3.3.2 Ball and Brown (1968) & Ball and Kothari (1994)

Ball and Brown (1968) observed that accounting theorists generally employed certain analytical models aligned to their thinking. The preferred model may have comprised only a few assertions or a rigorously developed argument. The identified method's shortcomings are that it ignores significant sources of knowledge, namely, the predictions of the model that conforms to the observed behaviour of naive and regression expected earnings models. They a supportable analytical inquiry oath to embraces all supportable assumptions that explain the predictive powers of the propositions.

Ball and Brown (1968) argued that the accounting theorist's analytical models' main limitations of a completely analytical approach are demonstrated through accounting numbers that cannot be defined substantively as they lack "meaning" and that is of doubtful usefulness. They constructed naive and regression expected earnings models on what the expected income is to be and subsequently investigated the market reaction when the expectation was not met:

- *Naïve model:* assume previously comparable period results are equal to the current year's earnings with the use of one variable in the form of earning per share (EPS)

- *Regression model:* assume that the earnings of different firms are related due to pervasive economic or market conditions and used two variables in the form of net income and EPS.

The CAPM is used to calculate the expected earnings to which the actual earnings are subtracted to arrive at the unexpected earnings. The abnormal return is derived from subtracting market return from the actual return as follows:

$$ARit = Rit - E(it)$$

$$AR_{it} = R_{it} - E\left((R_{it})|\, R_{imt}\right)$$

Where:

- $E(R_{it})$ is the expected/market return on asset i at time t
- R_{it} is the actual return on asset i at time t
- AR_{it} is the abnormal return on share i in time t

Furthermore, this study also assesses the usefulness of accounting income numbers by examining the information content and timeliness. The finding was that about 85 to 90 percent of the market reaction took place prior to the release of annual earnings. This was attributed to other timelier sources of information such as interim reports. The finding is supported by Ball and Kothari (1994) who found substantial share price movement occurring in the periods preceding the earnings announcement. Kornik (2005) found the issuance of interim reports and trading statement releases to lack significant market reaction and concluded that investors await confirmation from the earnings announcement. The investor-related behaviors or reactions perhaps stem from potential information leakage, market anticipation of other sensitive information and legitimate information dissemination. The value of information or the market reaction is quantified using the API_M (refer to above formula).

3.3.4 Unexpected earnings event and security returns drift

Foster et al. (1984) provide an explanation for systematic Post Earnings Announcement Drifts (PEADs) of the security returns with expectations models based on time series of earning and security return. The study found that PEADs are a persistent phenomenon over time and associated with the sign or magnitude of unexpected earnings changes. The four models used, namely, two were based on earnings forecast and the other two on share returns, the latter focusing on short-run and a longer timeframe to measure the market reaction.

In the SA context, Kornik (2005), Murie (2014) and Cata (2015) confirmed the association between ‘good’ and ‘bad’ news portfolios based on the sign and magnitude of the unexpected

earnings announcement and sign and the magnitude of security returns. These studies also observed the predictable abnormal returns drift in the period subsequent to the study event day.

In chapter 4 the study further elaborates on the selected short-run market reaction model to the direction and size of ‘good’ and ‘bad’ news portfolios in and around unexpected event news of [-2; +2], [-2; +0], [-2; +1], [+0; +1], [+0; +2] unexpected earnings model or measures and /or days variation and a drift of [1; +2] and [3; +5] window period.

3.4 EARNINGS EVENT STUDY METHODOLOGY

Kothari and Warner (2006) indicate that short-horizon methods are quite reliable, whereas, the long horizon has serious limitations, albeit, improved. The event study outcomes vary depending on the period and sample firms' characteristics. Certainly, the size of the firm, liquidity, volatility, market sentiments and all other price-sensitive factors contributes to the type of outcome received. According to Kothari and Warner (2006), the contributing factors reinforce the importance of using stratified samples to examine event study statistical properties. The study sample can be stratified based on the mentioned price-sensitive factors to included a split between voluntary and compulsory management forecast, changes in earnings of similar firms, previous and recent company-specific market events and perhaps the calendar time of these events.

The key features of this event study are to identify the event of interest together with the timing of occurrence. The importance of the selected timeframe is to closely monitor and assessed the impact of the event’s variable of interest, i.e unexpected earnings news to the observation of the security price movement. The literature review focuses on the selected window period of the event of interest, such as the trading statement releases and year-end earnings announcements. The publication dates are the earliest of the preliminary report, the annual financial statement, or the provisional report for earnings numbers publication and release date for trading statement.

3.5 RECENT UNEXPECTED EARNINGS EVENT STUDIES

This section reviews past and most recent studies on the association of unexpected earnings events and security returns. The reviewed literature considered the ‘good’ and ‘bad’ news portfolios based on the sign and size of unexpected earnings and the direction and magnitude

of the security price movement from emerging to developed markets. The explored literature is indicated below.

3.5.1 The information content of the magnitude of unexpected earnings

The most recent SA studies are of Kornik (2005) Murie (2014) and Cata (2015) found a positive relationship between the sign and size of ‘good’ and ‘bad’ news portfolios and the magnitude of abnormal security returns. The studies employed similar market models to assess the price formation process using simple expectation and unexpected earnings and analysts forecast EPS models to establish and evaluate the association and the effect of ‘earnings surprise’ and announcements. Elton, *et al, (*1981) criticised the use of traditional earnings estimation models that employs historic data to proxy the market expectation, as a consequence to measure the reaction, in favour of developing and utilising the expectational data through historical extrapolations of past data.

Kornik's (2005) and Cata's (2015) study presupposition was that the JSE is a semi-strong efficient market form. Whereas Murie's (2014) study invalidates market efficiency at the semistrong-form level as the security prices do not adjust instantaneously to new information contained in earnings releases, but rather over time. In SA several studies are challenging the JSE semi-strong efficient market theory partly because of the observed price inefficiency, ie security prices continued drift post releases or the earnings announcement. Contrasting study results on the post-release drift, Murie (2014) found significant post-release drift, albeit, based on a short-term model or days variation and Cata’s (2015) found a lack of significant drift in the post-earnings announcement period support and against semi-strong efficient market form, respectively. Ball and Brown (1968), Foster (1984), Ball (1992) and Kornik (2005) found in favour of semi-strong efficient market form.

Johnson and Zhao (2012) note a persistent but overlooked evidence of contrarian share price reactions to earnings surprises that often in the opposite direction. However, in extreme ‘earnings surprises’, the contrarian share returns are slightly less prevalent. And, concluded that the incidental contrarian share returns behaviour is statistically related to ‘‘noise’’ in the measured earnings surprises. The ‘noise’ consists of opposite revenue changes, earnings forecast revision, returns volatility and interim earnings surprises.

Beaver, Clarker & Wright (1979) expanding from Ball and Brown's (1968) primary concern of the examination of a no association hypothesis examined the association of unexpected earnings and the magnitude of abnormal share return. Examining both the sign and magnitude hypothesis of an association led to a belief that this could strengthen their findings of the null

hypothesis. They held a view that with properly constructed and direct research questions the treatment of the earnings forecast error may become more critical. The market model on which unsystematic security returns are measured herein defined as “residuals” are based:

$$R_{it} = a_i + B_j\, R_{mt} + \varepsilon_{it}$$

Where:

- R_{it} rate of return (percentage change in price including dividends) for security i at time t.
- R_{mt} is the rate of return in period t on a "market" portfolio of common stocks, where each stock's return is weighted according to its relative market value
- ε_{it} is the unsystematic return on security i in period t;
- a_i + βj are the intercept and slope coefficients specific to security i

Beaver, Clarker & Wright’s (1979) study outcome confirmed the existence of the association between unsystematic returns and the magnitude of earnings forecast errors.

3.5.2 The management earnings forecasts and share price returns

The trading statement releases consist of voluntary and compulsory management forecast after a prima facie evidence is obtained on the profit forecast or estimate supported by the company’s other source of information distribution (JSE Service Issue 14, 2011). Management provides information not already available in public to allow the investors to re-assess their beliefs and expectation to now be reflected in the updated intrinsic value of the security. Insofar as to the voluntary releases, the rationale behind management forecast could be informed by various things, for example, to re-evaluate the intrinsic value of the security to reflect the firm’s future potential. It has the potential to correct the current investor sentiments driven by factors outside the management control.

Patell (1976) examines the relationship between the information content of management voluntary forecasts disclosures and security price behaviour. A similar methodology to that of Ball and Brown (1968) was followed and used management earnings forecasts as the expected earnings. At times the management lacks accounting principles since it precludes an independent verification process in preparing management forecasts. In the SA context, the listing requirements compel the sponsor to ensure that an issuer complies with paragraph 2.11 on profit forecast (JSE Service Issue 14, 2011). Patel (1976) confirms that earnings forecast alters investors' beliefs and forecast content previously not publically available.

3.6 SECURITY PRICE MOVEMENT EVENT POSSIBILITIES

Many situations and factors are affecting the security price movement of a listed firm. The change in security returns varies owing to change in these situations ordinarily emanating from the market or firm. The variation in the security price creates an expectation of the firms' economic health. In this section we focus on the market situations, namely trading halts, commodity circle and general retailers sub-index.

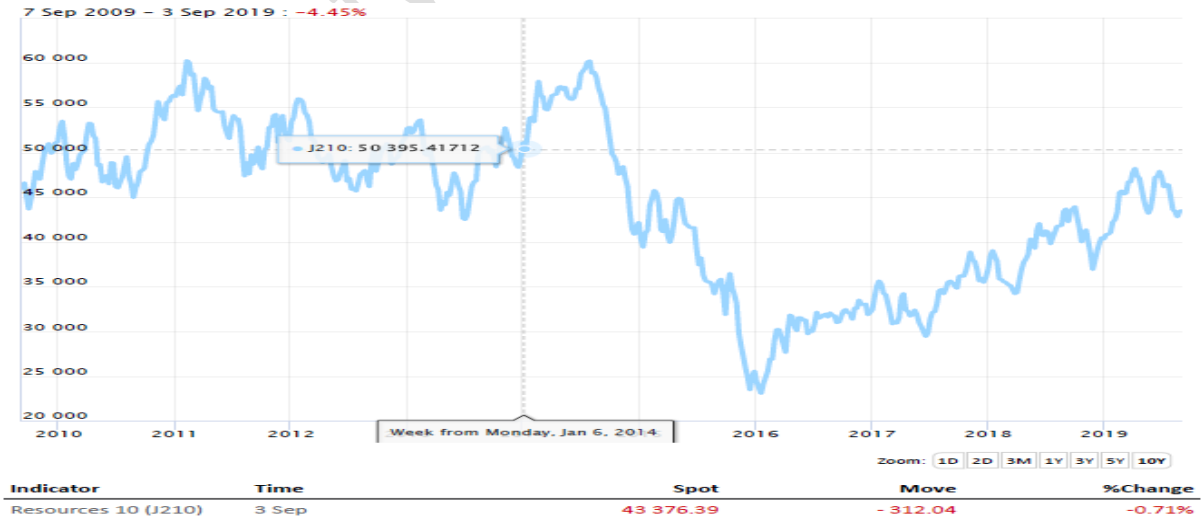
3.6.1 Trading Halts or market closure

Trading halts are the suspension of the impacted security from trading a day before the corporate event. This leads to a scheduled market closure resulting from this corporate event or reaction to company news (event). The security trading is halted pending the announcement or implementation of the corporate event. FTSE Russell Index Policy (2018) defines corporate events to be a reaction to company news (event) that might impact the security price.

3.6.2 Commodity circle – resource sector

The resource security value is affected due to the cyclical nature of commodity demand or circle. The security returns vary accordingly during these circles that may result in short-term losses, however, over a long period the equity resources value might be attractive.

Graph 1: Resource index



Source: https://www.sashares.co.za/resource-10-index/

The observation from figure 1 shows prices at highest between 2014 and 2015, however, they began to fall till 2016 thereafter increased below the highs. It is worth noting between 2010 to 2014 the index moved sideways and this was during the study period of Murie (2014) and Cata (2015). The study period covers the highest and lowest with an upwards trajectory since 2016.

3.6.3. General retailers sub-index – retail sector

Statistics SA (2019) produced a retail sales report on a conducted and released monthly survey at 13:00 of the retail trade industry covering retail enterprises including general retailers, food, beverages and tobacco, pharmaceutical and medical goods, cosmetics and toiletries, textiles, clothing, footwear and leather goods, household furniture, appliances and equipment; hardware, paint and glass, and all 'other' retailers. To improve the timeliness of this information at times stats SA (2019) had to estimate due to late response, however, revised in future statistical releases as soon as information becomes available.

3.6.4. Analyst forecast releases

The analyst earnings forecasts are an important element of the market information dissemination and are either collaborated or contrasted with the management forecast. According to Kornik (2005), analyst forecasts are a more accurate measure and an important measure of expectations than prior-year earnings.

Trading halts, commodity circle and analyst forecast, among others, could provide for an explanatory power on the effect of other timelier sources of information to unexpected event news. This could assist to explain the contrarian return and the magnitude of price movement on the event date.

3.7 THE FINANCIAL MARKET

3.7.1 Evidence from the international markets

The major global markets consist of many countries such as the US, Japan, and Europe, Germany, France, Italy, and the UK to name a few. And, emerging market economies (EMEs), namely: Asia, Europe, Latin America, the Middle East and Central and Eastern European markets (Lischewski and Voronkova, 2010).

A substantial body of literature confirms the presence of the effects of liquidity, several market factors and the size of global markets participants on the association earnings surprise with stock prices. The literature argued the impact of diverse factors on asset pricing, albeit, difficult to compare across different methodologies, events periods, and data frequencies.

The commonalities between international, emerging and local markets are generally the financial infrastructure such as the renowned Society for Worldwide Interbank Financial Telecommunications (SWIFT), South African Multiple Option Settlement (SAMOS) – payment and settlement system, regulation such as the Securities Transfer Tax Act no 25 of 2007) (STT Act) and self-regulatory organisations (SROs) such as Strate for oversight and regulation, embracing and emulating regulations from International Organization of Securities Commissions (IOSCO). However, other differentiators may include the level of market efficiency, accounting standards and securities regulation.

It has been discovered that liquidity is an essential price factor in emerging markets emanating from the size of the securities exchange, market participants or investors and concentration of relative trading volume. Perhaps the combination of these market features a determinant of the market efficiency form. Thus far, the literature reviews across different markets confirm the earnings-price relationship the biggest predicting factors of security returns not discounting the other diverse factors mentioned earlier. The study elaborates further on the emerging markets due to unique market factors such as size and liquidity, thereon, market efficiency.

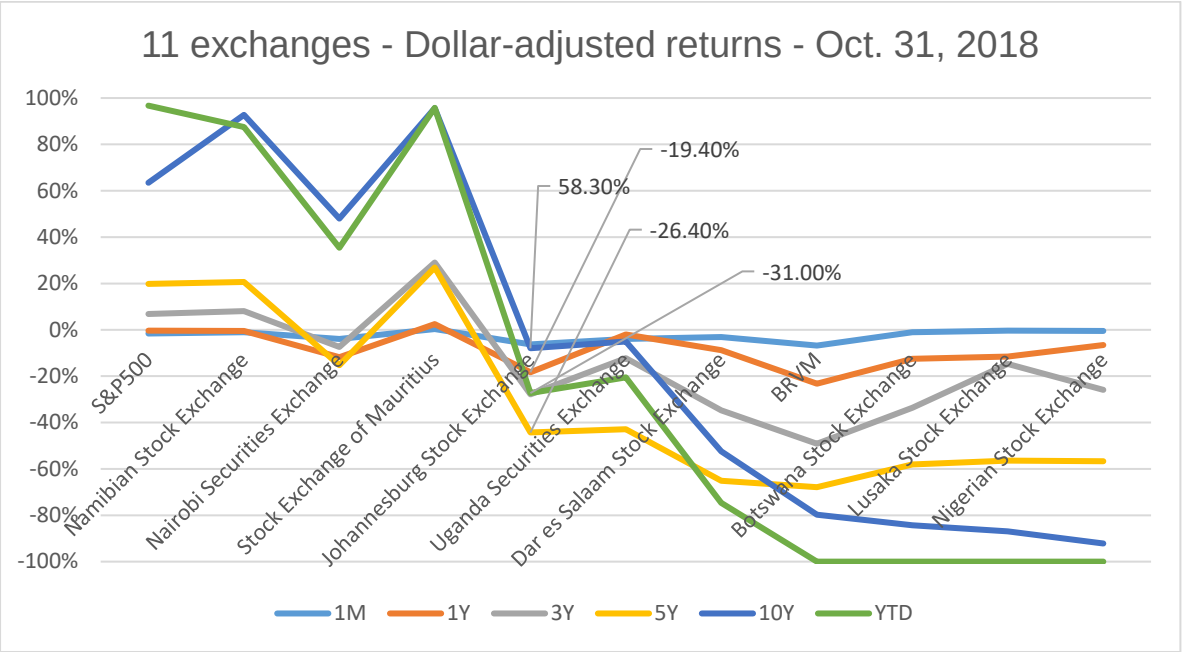
3.7.2 Evidence from the emerging markets

A simple definition of emerging markets is economies and stock markets progressing towards becoming advance (Kenton, 2019). The differentiating factors include liquidity in debts and equity markets, size of market exchanges, financial infrastructure which including systems, institutions such as banks and regulatory environment. The number of the emerging markets are as follows: International Monetary Fund (IMF) classifies, 23; Morgan Stanley Capital International (MSCI) classifies, 24; Standard and Poor's (S&P), 23; Russell classifies, 19 and Dow Jones classifies 22 countries (Kenton, 2019). Brazil, Russia, India, China and South Africa for a part of BRICS and all of the five countries are part of emerging markets exchanged. South Africa is the only African country of the five BRICS institutions.

Bajbai (2019) stated that in Sub-Saharan Africa about 29 stock exchanges are representing 38 countries which include two regional exchanges. The table below depicts (as of October 31, 2018) 15 select stock exchanges showing dollar-adjusted returns by each country. The below graph is a summary of 10 emerging countries ranked according to 10 years and

measured against the S&P500, as of October 31, 2018. The selected 10 year period is the time frame where South Africa shows a positive dollar-adjusted return.

Graph 2: The dollar-adjusted returns stock exchanges in Sub-Saharan Africa



Source: investinginafrica.com (table adapted to a graph)

The above performance graph indicates or illustrates the important factors for dollar-adjusted returns consisting of market factors, size and liquidity explaining market efficiency, thereon, security returns. The explanatory power of the emerging market countries' security returns is the exchanges' unique factors, the size of market capitalisation, development and sophistication of financial systems. The literature argues that liquidity risk is of significance in the emerging stock markets where the size of securities and investors is scarce and trading volumes are lower.

Beirne, Caporale, Ghattas & Spagnolo's (2010) paper examined the mature global market and emerging market (regional) spillovers into local emerging stock markets. The focus was on 41 emerging market economies (EMEs) in Asia, Europe, Latin America, and the Middle East. The study confirms that literature uses different methodologies, periods and data frequencies, although, applied a uniform specification to all 41 EMEs. The literature results of a study event must be interpreted with a careful collaborative, investigative and expansive analysis to contextualise the outcomes to that local market. Beirne et al (2010) study provided empirical evidence of spillovers from global and regional markets through the transmission of shocks (news) across markets and cross-border links into the emerging stock market returns. The study concluded the nature of cross-market linkages varies across countries and regions.

3.7.3 Evidence from the Johannesburg Stock Exchange

Knight's unpublished Ph.D. (1983, quoted by Murie, 2014) examined the effects of earnings announcements on the share price. The study event of classified 'earnings surprises' into 'good' and 'bad' news, adopted naive and regression market models and applied API to cumulate abnormal returns. The study provided evidence to significant market response to earning surprise and observed a return drift following the announcement.

Kornik's (2005) study partly contrasted two stock exchanges, namely, the New York Stock Exchange (NYSE) and the JSE Securities Exchange (JSE) based on liquidity (JSE - less) and size of the stock exchange (JSE - small). The empirical evidence on the relationship between accounting earnings and share returns was predominantly observed in NYSE and the same results were confirmed on the JSE. The earnings forecast was regarded as expected earnings and compared to actual earnings announced to compute the abnormal returns. The 'good' and 'bad' portfolios are classified based on the sign of the forecast error to explain the effect of 'earnings surprise' on the size, direction and sign of the stock returns.

Furthermore, the model used to estimate the expected earnings were ranked and results divided into deciles based on the sign and magnitude of the absolute analyst forecast errors using the same formula by Foster et al. (1984):

$$U(EPS_{it}) = \frac{EPS_{it} - E(EPS_{it})}{|EPS_{it}|}$$

The abnormal return is calculated as $AR_{it} = R_{it} - E((R_{it})|R_{imt})$. The risk inherent in the asset (ie unsystematic or specific risk) was regarded as the same as the systemic risk, i.e. beta assumed to be equal to one.

Murie (2014) and Cata (2015) were the first studies to focus primarily on examining the information content of trading statement releases with the adopted methodology were from Foster et al. (1984), Beaver (1968) and Kornik (2005) as follows:

$$FE_i^{ST} = \frac{(\Sigma_{t=-2}^{1} \tilde{u}_{i,t})/4}{\sigma(\tilde{u}_{i,t})}$$

$$FE_i^{MT} = \frac{(\Sigma_{t=-60}^{-5} \tilde{u}_{i,t})/56}{\sigma(\tilde{u}_{i,t})}$$

Where:

- FE_i^{ST} and FE_i^{MT} are *forecast errors* for ST – short term and MT – medium term
- $\sum \tilde{u}_{i,t}$ are the cumulative three-day abnormal returns over the short-run event, ie, the two days preceding and the day of the earnings announcement.
- $\sigma(\tilde{u}_{i,t})$ is the standard deviation of the cumulated abnormal return over the 60 *(M) and 100 *(C) trading-day period prior to the short term [- 2, 1] (M) and [- 1, 1] *(C) and medium [-60, -5] *(M) events period being examined.
- *(M) – Murie and *(C) – Cata.

In summary, the target firms were in the top 40 and 60 with a sample size of 58 and 128 trading statement releases for Murie (2014) and Cata (2015), respectively. Both studies found the sign and magnitude of unexpected earnings were significantly correlated with the sign and magnitude of the CAR.

3.7.4 Review of the Johannesburg Stock Exchange

3.7.4.1 Introduction

There distinguished global and regional stock exchange factors which include the effects of liquidity, market factors (eg interest rates), size (eg market capitalisation and number of participants) and the direction of the market sentiments at a given time play into the examined predictability of returns in the JSE.

Kruger (2011) examined the predictability of returns in JSE, in a way testing for market efficiency, using linear and nonlinear models to draw a conclusion on their forecasting capabilities over both stable periods and over the market crisis. The study confirmed the existence of predictable periods in share returns, however, the timing and occurrence of these predictable periods were confirmed less obvious. He concluded that because the newly generated information is unpredictable (ie timing and occurrence) that explains the sensitivity of the price movement. The unpredictable announcements when combined with the extent of the investor reaction, either over- or under-reaction, is the source of the apparent profitability (ie abnormal returns). The evidenced unpredictability nature of the stock price returns is indicative of the market efficiency of the exchange.

3.7.4.2 Size and liquidity

According to JSE (n.d.), the size of the exchange as measured by market capitalisation is currently ranked 19th in the world and the largest in the African continent. The expansion of JSE stems from significant events that include the acquisitions of Futures Exchange (SAFEX) in 2001 and the Bond Exchange of South Africa (BESA) in 2009. Now, consists of five financial markets, namely, Equities and Bonds as well as Financials, Commodity and Interest Rate Derivatives. However, the focus of the studies is on the equity market with almost 400 companies listed on the exchange across the mainboard and AltX. Two benchmark indices are consisting of the FTSE/JSE All Share Index, covering 99% of market capitalisation, and the FTSE/JSE Top 40 Index which tracks the top listings in a representative spread of sectors.

The evidence suggests that asset pricing anomalies in the South African market largely correspond with those in international markets (Kruger, 2011). The study test failed to attribute the size effect to the asset pricing anomalies. Van Rensburg (2002) suggested that the size effect as a factor in asset pricing anomalies was because the exclusion of small-cap stocks from the samples based on thin trading adjustments resulted in the outcome of such said studies.

The liquidity of SA financial instruments in comparison to the size of the economy is disproportionately larger than for comparable countries (JSE Limited Integrated Annual Report, 2017). The local register reflects 63 percent of JSE liquidity. It stated that the size of the market is relatively large, however, fewer participants lead to a concentration in the JSE's which in turn affects liquidity.

3.7.4.3 Segmentation on the JSE The

Van Rensburg (2002) pointed out that the All-Share Index is conventionally employed as the market proxy in SA beta estimation which, is not mean-variance efficient. This renders the use of one factor model such as CAPM unproductive and does not hold on to the JSE. Furthermore, the study found that a two-factor APT model, namely, the Financial-Industrial (FINDI) and Resources/Mining indices (MINING) provides for a superior account of the way assets are priced on the JSE.

3.7.4.4 Disclosure requirements on the JSE

JSE Limited Listings Requirements compel an issuer to comply with paragraph 3.4(b)(i) to (viii) except for those who publish quarterly results (Service Issue 14, 2011). Furthermore, all affected Issuers must publish a trading statement as soon as they are satisfied that a reasonable degree of certainty exists that the financial results for the period to be reported upon next will differ by at least 20% (Service Issue 14, 2011). Subsequently, if and when an issue becomes reasonably certain that their previously published number, percentage or range in the trading statement is no longer correct, then the issuer must publish another trading statement providing the revised number (Service Issue 14, 2011). However, the determination of a reasonable degree of certainty in terms of 3.4(b)(i) to (viii) is a judgment decision by an issuer and its directors to which JSE does not involve itself.

The probability and rationale behind the trading statement publication are based on the firm's management judgment call and may elect to comply with paragraph 3.4(b)(i) to (viii) voluntarily which makes differentiation a textbook exercise. This study target firms or issuers in the FTSE/JSE Top 40 index that are required (ie compulsory) and elected (voluntary) to comply with the publishing of the trading statement in terms of paragraph 3.4(b)(i) to (viii).

3.7 CONCLUSION

The fundamental insight of the reviewed literature is that it sufficiently explains the market efficiency from a variety of forces and the market impounding of available information into security prices fast enough that arbitrage opportunities cannot be exploited systematically. The semi-strong form of EMH features prominently in the JSE and explains the phenomena of the relationship between accrual accounting income numbers, the intrinsic value of stocks and security returns.

The international, regional and local literature indicates the existence and the impact thereof of diverse factors such as other price-sensitive market factors, size and liquidity on the asset price. Furthermore, the reviews indicate the test of market efficiency in all exchanges is arrived at using different methodologies, periods, and data frequencies hence the extent of the market factors impact differs from each market place.

CHAPTER 4
THE RESEARCH PARADIGM AND METHODOLOGY APPROACH
(Research Methodology and hypotheses, and Data)

4.1 INTRODUCTION

The research study focuses more on a functionalist worldview, herein also referred to as consensus perspectives, with a qualitative methodological approach taken together with the use of a quantitative approach. This view is based on the definition by Saunders, Lewis & Thornhill (2009: 120) concerned with the rational explanation of behaviours and institutions such as why a particular organisational problem is occurring concerning its functions performed.

According to Saunders et al. (2009: 120), the business structures or entities within this paradigm are seen as rational entities in which rational explanations offer solutions to rational problems and organisational endeavours. The rational behavioural expectation is in sync with the key assumptions underlining the efficient market hypothesis (EMH), that of the availability of information (efficiency) and the rationality of the market (price efficiency), i.e. prices respond immediately to new information.

An issuer's compulsory and voluntary trading statement releases and date of earnings announcements were obtained through Stock Exchange News Service (SENS) from IRESS. The publication times and confirmation of earnings announcements were obtained from Bloomberg.

4.2 RESEARCH METHODOLOGY

In ascertaining the effects of unexpected earnings or 'earnings surprises' and earnings announcements announced on the price formation process, the adopted approach is the return-based unexpected earnings models by Foster et al. (1984).

The market return is determined using the two-factor APT model (Van Rensburg, 2002), it shows the gains or losses when all and immediate market sentiments of the sizeable investors are fully reflected in the security price. The expected market return is calculated following the below steps, herein, referred MAND-GLEN steps:

1) Using the regression model ($y_i = \alpha + bx_i + \varepsilon_i$), regress the returns of the Financial-Industrial and Resource indices against the security return;

2) Consider the results in step 1 to eliminate the effect of the correlation of the two indices;

3) Removal of the interception (making constant zero) and non-significant indices (measured by the insignificance of t-statistic outcome);

4) Run the regression again and assorted with the significant index (either FIND or RESI); and

5) Re-run the regression analysis with intercept, observe the results of the significant predictor, ie either FIND or RESI, and consider the expectation on the movement of adjusted r-squared as follows:

    - Consider the adjusted r-squared of steps 4 and 5, an increase mean the remaining predictor has a positive relationship with the measured security return.

    - In deciding to compare the coefficient of determination, R^2 adjusted R-squared to consider which is better or whether the latter is greater.

When the return predictors (i.e market return – FINDI and RESI) are equal to zero then the average security return is the market return. However, given the unlikelihood of the two predictors assuming values equal to zero hence it makes sense to remove the intercept. In such circumstances, the intercept doesn't tell you anything about the relationship between security and market return. In addition, the removal of a non-significant index to eliminate the correlation between the two predictive variables (i.e market return predictors). Information gets lost or left behind the modeling process requiring the use of Akaike Information Criterion (AIC)

to test for the quality of statistics. It is an objective way to decide on the fitness of models. The formula used is:

$$AIC = In\ \frac{S_r}{N} + 2(K-1)$$

Where, $In\ \frac{S_r}{N}$ is the maximized log-likelihood of the model parameters given the data and K is the number of estimable parameters, S_r the residual sum of squares (SS), n is a number of observations, and k is the number of estimable parameters (excluding the intercept) that we have fit. The model with a better fit has a lower AIC value. Parameters (K or P) are equal to the degree of freedom (Dof), ie data points (observations). The acceptable AIC values are within 0 – 2 units examined against the remaining model parameter (i.e FINDI or RESI) after removing the non-significant index.

This study seeks to establish the relationship between the security return (dependent variable) and two independent variables, namely FIND and RESI (i.e the predictors). Durbin-Watson statistics can be used to eliminate the predictors' autocorrelation and /or to decide whether to reject the null hypothesis (Braun, Altan and Beck, 2014). The Durbin-Watson statistics is defined as follows:

$$d = \frac{\sum_{i=2}^{n}(e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}$$

Where the $e_i = y_i$ – ŷi are the residuals, n the number of observations and k the number of predictors (exclude y-intercept).

If d < d_L reject H_0 : ρ ≤ 0 (and so accept H_1 : ρ > 0)

If d > d_u do not reject H_0 : ρ ≤ 0 (presumably ρ = 0)

If d_L < d < d_u test is inconclusive

Durbin-Watson excel calculation is based on the regression analysis values, namely the sum of squared residual (SS) and residual values to determine the sum of squared differences of residuals. The computation of DW value is derived from dividing the sum of squared differences of residuals by the sum of squared residuals (Savin and White, 1977). Based on the rule of thumb the test statistic values are expected to be within the range of 1.5 to 2.5 to be considered relatively normal (refer to Appendix X).

The share returns are examined in four distinct periods modified from Das *et* al. (2007) and Cata (2014) together with a complete observation or window periods as referred to in sections 1.2 and 2.1.3. The security returns investigation period focuses on the direction and size of

'good' and 'bad' news portfolios in and around unexpected event news of [-2; +2], [-2; +0], [-2; +1], [0; +1], [0; +2] unexpected earnings model or measures and /or days variation and a drift of [1; +2] and [3; +5] window period.

4.3 RESEARCH HYPOTHESES

The developed hypothesis is designed to determine the effects of unexpected earnings news on the JSE price formation process at the identified signal days. The discussed hypotheses together with the description of the research methodology followed in testing for these hypotheses revolves around a collection of the below data points:

- The daily total returns herein referred to log return, include both the dividends and share price returns.
    - The daily total return is the difference between the initial cost of the security (P_0) and the closing security price (P_1) plus dividend/interest divide by the initial cost of the security (P_0).
- A total or market return consists of the market index which includes JSE Financial-Industrial and Resource indices.

The considered hypotheses for the study are as follows:

- The association between the unexpected earnings (i.e releases and announcements) new and security returns

  H1: The unexpected earnings contain material, sufficient and new information as reflected in investor reactions through a reassessment of beliefs and change of expectations (Beaver, et al., 2005). The hypothesis is as follows:

  - H_0: (AR_0| trading statements/announcements) = 0

  $\therefore$ Statistically significant abnormal returns, provide evidence that unexpected earnings contain new and sufficient materially information, in the period surrounding the releases.

  - H_1: (AR_0| trading statements/announcements) ≠ 0

  $\therefore$ No statistically significant abnormal returns, provide evidence that unexpected earnings do not contain new and sufficient materially information, in the period surrounding the releases.

H2: The effects of the new information (i.e size and sign of unexpected earnings / 'earnings surprises') reflected in releases and announcements are associated with the size and sign of abnormal returns. The hypothesis is as follows:

- H_0: ($u_{1-}\, u_2$| trading statements/announcements and CAR) = 0

∴ the sign of trading statements/announcements and the sign of CARs are independent

- H_1: ($u_{1-}\, u_2$| trading statements and CAR) ≠ 0

∴ the sign of releases and announcements is associated with the sign of CARs. The Chi-Square statistic ($x^2\ stat$) test the relationship between and within trading statement releases and calculated CARs to ascertain the significance thereof.

- The magnitude of firms' unexpected earnings on the abnormal share returns

H3: The magnitude of firms' unexpected earnings measures or the resultant forecast errors is positively associated with the magnitude of security returns. The hypothesis is as follows:

- H_0: ($u_{1-}\, u_2$| trading statements and CAR) = 0

∴ No relationship between the magnitude of the unexpected earnings measures and CARs in the post-release period.

- H_1: ($u_{1-}\, u_2$| trading statements and CAR) ≠ 0

∴ A positive relationship exists between the magnitude of the unexpected earnings measures and CARs in the post-release period. The Regression Analysis ($y_i = \alpha + bx_i + \varepsilon_i$) is used to determine the relationship between the size of the security price reaction to unexpected earnings or 'surprise earning' and abnormal returns.

- The post-trading statement releases and announcement return drift

H4: There is no association of rational momentum effects of market reaction post-releases and preceding earnings announcements. Or

H4: Abnormal returns are not earned in the period subsequent to unexpected earnings.

The hypothesis is as follows:

- H_0: (CAR_{1+T}) = 0

∴ Abnormal returns are not earned in the (1, T) day period subsequent to unexpected earnings.

- H_0: (CAR_{1+T}) ≠ 0

∴ Abnormal returns are earned in the (1, T) day period subsequent to unexpected earnings. The sign is associated with the sign of CARs in the (1, T) day period subsequent to unexpected earnings.

- The information content of unexpected annual earnings announcements

H5: The market reaction at the time of the earnings announcement is negatively associated with the magnitude of the post-trading statement releases. The hypothesis is as follows:

- H_0: (AR_0| actual earnings announcement) = 0

∴Statistically significant abnormal returns following the publications of actual earnings announcements.

- H_1: (AR_0| actual earnings announcement) ≠ 0

∴No statistically significant abnormal returns following the publications of actual earnings announcements.

H6: The association of investor reaction to actual earnings announcement and the security price movement in the post-trading statement period; OR

H6: the effects of the price movement in the post-trading statement on investor reaction to an annual earnings announcement. The hypothesis is as follows:

- H_0: ($u_{1-}\, u_2$| trading statements and annual earnings announcement) = 0

∴ No relationship between the magnitude of the post-trading statement release drift and investor reaction to the annual earnings announcement.

- H_1: ($u_{1-}\, u_2$| trading statements and annual earnings announcement) ≠ 0

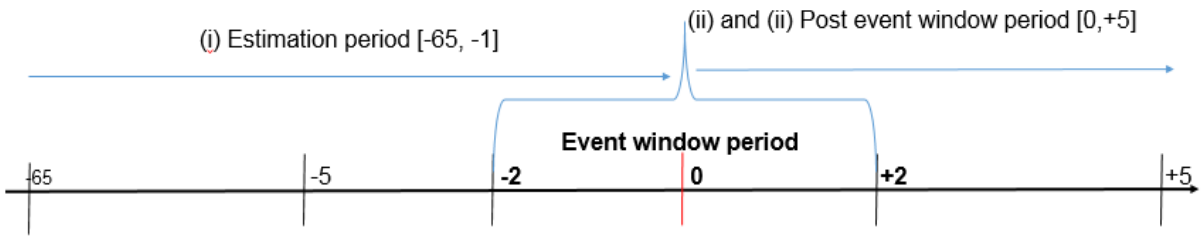
∴ A relationship between the magnitude of the post-trading statement release drift and investor reaction to the annual earnings announcement. The Regression Analysis ($y_i = \alpha + bx_i + \varepsilon_i$) is used to determine the relationship between the size of the share price reaction to the annual earnings announcement and the magnitude of the post-trading statement announcement drift.

4.4 THE EVENT STUDY

The primary event of interest is trading statement releases, followed by, the measure of the market's reaction by observing a sample of firms'' security returns behaviour at the time of event occurrence. The secondary is on the annual earnings announcements to assess the potential impact of the earnings announcement following the trading statement release. The data analysis indicates that on average the announcements follow releases by 17.5 days when excluding outliers decreased to 15.6 days inclusive of all days, however, Murie, (2014) is 9 days and (Cata, 2015) is 13 days.

When you look at the number of 'good' vs 'bad' news portfolios the market appeared more bullish in Cata's (2015) and neutral in Murie's (2014) which approximately mirrored the market sentiments. Whereas, in this study, the market sentiments appear more bearish towards the later years when observing the market capitalisation of the top 10 that constitute a total of 65 percent weighting as of 31 January 2019 (FTSE Russell Factsheet, 2019).

Figure 1: unexpected earnings events window period



The timeline of the effects of the new information on the security price is observed reflected in Figure 1 (above) examining the market reaction:

(i) Pre-event window period [-65, -1]

The beta trailing window period or estimation period of 65 day periods preceding event window of [0, 0] to ascertain the rational expectations versus the investor expectations (i.e. estimation periods).

(ii) Event window period [-2, 0], [0, 2] and [-2, 2]

A two days trading period of [-2, 0] before and [0, 2] after unexpected earnings event and the variation of days surrounding the event day, i.e [-2, 2] event window.

(iii) Post-event window period [+3, +5]

The primary focus on the period subsequent to the trading statement releases and preceding the actual earnings announcement and post annual earnings announcement.

4.4.1 The unexpected earnings model or measures and portfolio classification

The study classifies the 'good' or 'bad' news portfolios based on the sign of the trading statement released using a simple expectations model and the magnitude and sign of the three unexpected earnings models. The study examines the prediction of the direction together with the magnitude of CARs in the period subsequent to trading statement releases and earnings announcements. The releases contain management's forecast or 'estimates' of earnings changes to the previous comparable period reported results (Murie, 2014).

Elton, Gruber and Gultekin (1981) criticise the traditional earnings estimation models that use historical data in an attempt to measure the impact of expectations, as opposed to expectational data to conduct historical extrapolations of past data, that the authors hope will serve as a proxy for expectational data. They claim that the event studies using historic data for earnings estimation models further reveal conspicuous shortcomings in their estimation pointed out by Elton et al. (1981) and it is because there is little research examining expectational data. Furthermore, Murie (2014) revealed that trading statements lack historical depth and are unpredictable therefore investors may perceive trading statement data to be immaterial.

4.4.2 Simple expectations model classification

In testing for the impact of the information content of the unexpected earnings on the security price, a simple expectation model is used to classify event news as 'good' or 'bad' news portfolios based on the sign of the cautionary earnings announcement (Cata, 2015).

4.4.3 The short-term returns-based unexpected earnings models

In the measurement of the market reaction, this study uses both a simple expectation model and short-term security returns unexpected model of the unexpected earnings classified into good' or 'bad' news portfolios based on the sign of trading statement (Cata, 2014). Foster et al., (1984) calculate the returns based on the unexpected earnings measures, thereby, focusing on the short-run market reaction to the 'earnings surprise' as follows:

$$FE_i^{SR} = \frac{\Sigma_{t=-2}^{0} \tilde{u}_{i,t}}{\sigma(\tilde{u}_{i,t})}$$

Where:

- FE_i^{SR} is the *forecast error*.
- $\Sigma_{t=-2}^{0}\tilde{u}_{i,t}$ are the cumulative five, three and two-day abnormal returns over the short-run event, ie, the combination of the two days preceding and post, and the day of the earnings announcement.
- $\sigma(\tilde{u}_{i,t})$ is the standard deviation of the cumulated abnormal return over the 65-trading-day period prior to the [0, 0] event period being examined.
- The variation of days surrounding the event day are [- 2, -0] [-1, 0], [0, 1], [0, 2] and [2, 2] event windows.

Note that the [**r**, **x**] notation refers to the period from day **r** falling before the event date to the day **x** falling after the event date. On the event date, either **r** falls before or **x** falls after the event date.

4.4.4 Abnormal return estimation calculations

There are various benchmark return models, herein, also referred to as expected return models, used in the calculation of abnormal returns (Merwe, 2016). Huberman and Wang (2005) state that the APT-model is one period to multi-periods that delivers arbitrage-free pricing of existing assets noting a factor structure of their return. And, investors believe that the stochastic properties of returns of capital assets are consistent with a factor structure. The returns are regressed on the factors, ie predictive variables or market return predictors and the model parameters or coefficients are used on benchmark securities returns to compute expected returns.

Van Rensburg (2002) found that a dichotomy exists in the SA market and that the Financial-Industrial (FINDI) and Resources/Mining indices (RESI) are the best market proxies for the JSE market returns. In the determination of the expected or benchmark returns, a two-factor model was used as the market observable proxies, namely the Financial-Industrial (FINDI) and Resources/Mining indices (RESI). In capturing the security prices movements, returns are adjusted for individual firms' systematic risk (ie b_{fi} and b_{ri}) using Van Rensburg's (2002) two-factor model. The computation of the abnormal security returns for each of the sample firms are as described as the formula:

$$AR_{it} = R_{it} - (E(R_{it})|R_{mt})$$

$$\therefore AR_{it} = R_{it} - a_i - b_{fi}R_{FINDI} - b_{fi}R_{RESI}$$

Where:

- AR_{it} is the daily abnormal return of security i for the period t.
- R_{it} is the return on firm i in period t.
- $(\mathrm{E}\ (R_{it})|\ R_{mt})$ is the return on the relevant market index (FINDI or RESI) in period t.

The model applied is as follows:

$$R_{it} = a_i + b_i R_{Mt} + \varepsilon_t$$

$$R_{it} = a_i + b_{fi} R_{FINDI} + b_{fi} R_{RESI} + \varepsilon_t$$

$$\therefore R_{it} = a_i + b_{fi} R_{FINDI} + b_{fi} R_{RESI} + \varepsilon_t$$

$$\therefore (E\ (R_{it})|R_{mt}) = a_i + b_{fi} R_{FINDI} + b_{fi} R_{RESI} + \varepsilon_t$$

Where:

- (b_{fi} and b_{ri}), are the JSE FINDI and RESI indices, predictive factors.
- a_i is an intercept term with no special theoretical significance in the market model.
- ε_t is a residual error or error term, approximately zero.

Van Rensburg (2002) concludes that individual security returns are influenced by either one of the two factors but seldom by both. Refer to section 4.2 for steps taken to remove the noninfluential factor, ie eliminating the non-significant indices measured by insignificant t-statistic outcome).

4.4.4.1 Cross-sectional aggregation

Kolari and Pynnonen (2010) warned of event-date clustering over is a serious challenge, even when cross-correlation among abnormal returns is relatively low, in terms of over-rejecting the null hypothesis of zero average abnormal returns when it is true. In this study cross-sectional correlation doesn't arise for two reasons, namely, the sample firms' release or event dates are not on the same day and we employed Akaike Information Criterion (AIC) and Durbin Watson (DW) statistics (refer to 4.2).

In testing for information efficiency (Beaver, et al., 2005) the study determines whether the cross-sectional distribution of returns at the time of an event is systematically different from predicted (Kothari and Warner, 2007), ie abnormal. Therefore, for N number of securities in the sample, the cross-sectional mean abnormal return for any period t is (Kothari and Warner, 2007) calculated as follows:

$$\overline{AR}_{it} = \frac{1}{N} \sum_{i=1}^{N} AR_{it}$$

Cata (2015) used t-statistic to test for the statistical significance of the average cross-sectional mean abnormal returns (ARs) under the null hypothesis H_0: AR = 0:

$$t_{AR} = \frac{\overline{AR_{it}}}{\sigma(AR_t)/\sqrt{n}}$$

Kothari and Warner (2007) assessed the effects of the information contents on security returns to examine whether the mean cumulative abnormal returns for periods around the event equal to zero.

4.4.4.2 Time-series aggregation - cumulative abnormal return (CAR)

In testing for the market efficiency, the study considers the initial market reaction to new and significant information content to predict the direction and duration together with the magnitude of CARs in the period subsequent to trading statement releases and earnings announcements. The examination of post-event return drift observation provides information on market efficiency. The abnormal performance average abnormal returns are added together to calculate CARs according to the formula (Kothari and Warner, 2007):

$$\overline{CAR_{it}} = \sum_{i=1}^{N} \overline{AR_{it}}$$

Where:

- $\overline{AR_{it}}$ is the average abnormal return for firm i at time t.
- N is the number of securities or firms in the portfolio.
- T is the horizon length of a period to which the abnormal returns are being aggregated.

Both the CAR and Buy-and-hold Abnormal Returns (BHARs) methods test for the null hypothesis (H_0: AR = 0). Kornik (2005) and Murie (2014) registered the shortcomings in the CAR calculations of not taking into account the compounding effects, however, concluded that in the short run it is negligible. Under the null hypothesis (H_0: AR = 0) to test for statistical significance the following t-statistics is used (Cata, 2014):

$$t_{CAR} = \frac{CAR_t}{\left[\sum_{S=S_1}^{S_2} \sigma^2(AR_s)\right]^{1/2}}$$

$$CAR_{it} = \sum_{i=1}^{N} \overline{AR_{it}}$$

4.5 CONCLUSION

The identified research methodologies are used to determine or estimate the security abnormal returns, prior to or after unexpected earnings events. Firstly, it is to ascertain the benchmark or expected return using a simple expectation based on the sign of the releases and unexpected earnings measures to classify the 'earnings surprise' or unexpected earnings into good' or 'bad' news portfolios. Secondly, it is the observation of security price behaviour on and around the time of the event. In an attempt to answer the research question on the effects of unexpected earnings on the price formation process, several hypotheses were developed for testing. The event study measure or models are meant to gauge the predictability of future security returns (Marie, 2014).

CHAPTER 5
DATA COLLECTION AND DESCRIPTIVE STATISTICS

5.1 INTRODUCTION

The study data consist of opening, daily intra-day and closing prices, unexpected cautionary and annual earnings announcements between January 2014 to March 2019 were obtained for a sample of firms listed on JSE. Data times were carefully checked as some of the announcements take place prior, during and after market opening. The cautionary earnings data is a combination of compulsory paragraph 3.4(b)(i) to (viii) and voluntary paragraphs 8.35 to 8.44 or 22.19 of the regulatory and statutory requirements to publish period financial disclosures (JSE Service Issue 14, 2011). In this section, the study presents data details and provides descriptive statistics to highlight some of the data's salient features.

5.2 DATA SOURCES AND SAMPLE SELECTION (Table 1: full sample)

A much larger sample of 172 observations is used in this study that consists of 120 'good' and 52 'bad' news portfolios. The trading statement releases were 223 between January 2014 and March 2019, however, reduced to 172 because certain dates were in conflict with the beta trailing window period or estimation period of 65 days. The data is collected from the SENS database on IRESS (ie McGregor BFA) concerning trading statement releases and earnings announcements for the study period of January 2014 to March 2019.

The end of day (EOD) daily total return indices include both dividends and security price movement were obtained from individual share's total return indices sourced from Datastream/Bloomberg.

The criteria for the firms' sample selection were as follows:

- The firms must be a constituent of the FTSE/JSE Top 40 Index;
- The issuer must have published a trading statement in the period from January 2014 to March 2019 (including voluntary trading statements);
- The date of trading statement release and earnings announcement must be available on the SENS news service; and
- The announcement date of year-end earnings is the earliest of the publication date of the preliminary report, the annual financial statement or the provisional report (Cata, 2015).

Table 1 (below) provides for descriptive statistics of the sample firms' security returns. It consists of average returns (mean), standard deviation (StDev), minimum (Min), maximum (Max), and skewness (Skew) calculated for each of the 172 securities reported in **Table 1.**

Table 1: Summary Statistics (January 2014 – March 2019)

Sample size	Firms	Mean (%)	StDev	Min (%)	Max (%)	Skew	ICB Supersector	Releases
1	Absa Group Limited	0.00012	0.01870	-0.15698	0.10905	-0.25270	Bank	2
2	Anglo American Platinum Ltd	0.00050	0.02725	-0.08672	0.17919	0.53683	Basic resources	10
3	AngloGold Ashanti	0.00028	0.02929	-0.15821	0.12121	0.19930	Basic resources	6
4	Aspen Pharmacare Holdings	-0.00075	0.02146	-0.33807	0.10203	-3.49878	Health Care	8
5	Capitec Bank Hldgs Ltd	0.00140	0.01809	-0.13457	0.08967	-0.36703	Banks	10
6	Discovery Ltd	0.00035	0.01727	-0.15400	0.05192	-0.34213	Insurance	11
7	Exxaro Resources	0.00005	0.02705	-0.12610	0.17210	0.16842	Basic resources	11
8	First Rand Limited	0.00040	0.01879	-0.16065	0.12236	-0.23860	Banks	3
9	Impala Platinum Holdings	-0.00059	0.03212	-0.12130	0.19673	0.49856	Basic resources	10
10	Imperial Logistics Limited	-0.00016	0.02297	-0.12000	0.12434	-0.02361	Industrial Goods and Services	5
11	Kumba Iron Ore	-0.00001	0.03615	-0.20373	0.29725	0.32844	Basic resources	11
12	Mondi Ltd	0.00041	0.01527	-0.08522	0.07151	-0.22614	Paper	7
13	Mr Price Group	0.00006	0.02260	-0.19628	0.09519	-1.24850	Retail	7
14	MTN Group	-0.00064	0.02268	-0.21586	0.16606	-1.28175	Telecommunications	9
15	Naspers	0.00073	0.02129	-0.08577	0.10384	0.06615	Media	9
16	Nedbank Group	0.00013	0.01699	-0.11146	0.06777	-0.19072	Banks	1
17	PSG Group	0.00079	0.01864	-0.13273	0.07038	-0.47123	Financial Services	7
18	Remgro	-0.00007	0.01532	-0.08391	0.09529	0.19552	Industrial Goods and Services	6
19	RMB Holdings	0.00031	0.01794	-0.13319	0.11471	-0.04635	Banks	4
20	Sanlam	0.00024	0.01907	-0.11270	0.08854	-0.29797	Insurance	2
21	Sasol	-0.00015	0.01909	-0.11452	0.10032	-0.03757	Oil and Gas	11
22	Shoprite	-0.00002	-0.15330	-0.15330	0.10748	-0.18845	Food retailers - wholesalers	1
23	Standard Bank Group	0.00026	0.01782	-0.14550	0.07025	-0.33311	Banks	3
24	The Foschini Group Ltd	0.00036	-0.11762	-0.11762	0.13030	-0.09932	Retail	2
25	The Spar Group	0.00029	0.01546	-0.06446	0.08181	0.11067	Food retailers - wholesalers	2
26	Tiger Brands	0.00005	-0.09365	-0.09365	0.10648	-0.22672	Food retailers - wholesalers	6
27	Truworths International	-0.00009	0.02172	-0.12459	0.09078	-0.08282	Retail	1
28	Woolworths Holdings	-0.00031	0.01800	-0.10512	0.21163	-0.03989	Retail	7
							Total example	172

The performing securities are with the highest average returns of 0,00140 (Capitec), 0,00079 (PSG Group), 0,00073 (Naspers), 0,00050 (Anglo American) and 0,00041 (Mondi). The least performing are with the lowest average returns of 0,00015 (Imperial), 0,00016 (Woolworths), 0,00059 (Impala), 0,00064 (MTN) and -0,00075 (Aspen). Similarly, the most securities to exhibit the highest volatility are 0,03615 (Kumba Iron Ore), 0.03212 (Impala Platinum Holdings), 0,02929 (AngloGold Ashanti), 0,02725 (Anglo American Platinum Ltd) and 0,02705 (Exxaro Resources). Furthermore, most of these securities have a negative skewness with only 8 have a positive skewness and this is an indication there were more negative extreme price movements than positive ones over the study period.

5.3 STUDY DATA LIMITATIONS AND FUTURE OPPORTUNITIES

In this study, a sample of 172 released cautionary announcements although almost greater than the combined 58 (Murie, 2014) and 128 (Cata, 2015) trading statement releases with a longer sample period still contain a relatively small sample. Certainly, the positive average return on 18 securities over the sample period is reflective of both the bearish and bullish market sentiments in contrast to Murie's (2014) and Cata's (2015) bullish trend. Although, a reasonably smaller bad news trading statement releases but almost equal to the combined 28 (Murie, 2014) and 31 (Cata, 2015). The security price direction in 28 out of 52 event dates (ie down price movement) was associated with the sign of the bad news portfolios which explains the bearish and bullish market sentiments.

In examining the security returns the observed days' variation represents a wider short-term event view of pre and post-window periods. This provides for a new measurement of the market reaction but more so present an opportunity for future studies to either explore the same variation in this study but for a longer sample period starting from 2010 to date and /or consider the combination of window periods in (Murie, 2014), (Cata, 2015) and this study for an improved view.

The limitations of this study are a lack of robustness because of smaller data in comparison to Kornik's (2005) 270 observations from a longer sample period and a lack of balanced variation in voluntary versus compulsory releases warranting a separate analysis considering the former (ie voluntary) in future. The market response on voluntary management forecast appears more trustworthy news for an investor, refer to 7.3.2

Currently, there is an improved trading statement history or data considering periods from 2010 to date and in-depth analysis of the information inside the releases which provide for interesting future studies in understanding the size and extent (drift) of the market reaction.

5.4 CONCLUSION

In compiling this study, the researcher uses the primary data obtained from the market data portals using the identified firms' sample selection criteria. The sample of firms was qualitatively and quantitatively analysed for a better and in-depth understanding of the application of unexpected earnings measures or models and a portfolio classification.

This data analysis is instrumental in forming an opinion on the JSE efficient markets model of semi-strong form market efficiency and for the examination of an investor reaction to unexpected event news. And, whether the initial reaction to unexpected earnings an investor or trader can use it to predict the direction and magnitude of CARs.

CHAPTER 6
EMPIRICAL RESULTS

6.1 INTRODUCTION

The study's empirical results provide for an interesting observation which to a certain degree is contrary to the previously conducted studies on both the effects of trading statement releases and unexpected annual earnings on the JSE asset price/valuation and security return.

It must be generally accepted that there are several intervening events throughout the market opening. Summarily referred to as micro and macro-economic variables or events of interest, relevant or prevailing to the study sampling period that could have contributed to the observed outcomes (Holman, 2018). Some were one-time events that could have given rise to a certain market attitude, for example, the time elapsed since the economic crisis, Nene-gate, corruption and rating agencies. The two most relevant studies of Murie (2014) and Cata (2015) covered a period predominantly bullish market sentiment. This further explains the observed magnitude of the initial response and the extent of the direction of firms' unexpected price reactions classified according to the sign of the trading statement.

The estimation of ARs has greatly influenced by the accuracy of the unexpected earnings model resulting from the selection of the trailing window period used to predict the estimation parameters. The investor's continuous access and use of timely sources of information contribute to the extent and direction of price reaction. The investor information ecosystem allows for the security price adjustments to regular or continuous (re)production of market information that is materially similar to the information contained in unexpected earnings. Then the investor sentiments ought to be fully captured in the prevailing security price. This formed part of the justification of the strong argument of an alternative definition by Beaver (1968) that the new information must be sufficiently material to induce changes to optimal portfolio holdings by individual investors.

The crux of this chapter is on whether the information contained in the unexpected earnings is gradually impounded into security prices rather than an instantaneously – a test of informational and market efficiency (Murie, 2014).

6.2 UNEXPECTED EARNINGS MEASURES OR MODEL ACCURACY

6.2.1 Beta estimation

The most accurate or 'true' beta estimation is adversely affected by the disturbances of high-frequency security price data, herein referred to as the market microstructure noise, which estimates the parameters unstable. A market noise means a data anomaly implying unpredictability or greater individual firms' systematic risk. It can be avoided through the price data collection at an efficient rate for analysis and a selection of the optimal time interval taken into account in the calculation of realized beta, ie beta trailing window period (Ryu, 2011). He further found that an appropriate sampling frequency and the trailing window period were empirically found to be as short as 1 minute and as long as 1 week. The market microstructure noise is mitigated by the underlying beta time-varying factor selection of 65 days trailing window period and high liquidity reduces noise level. It then strengthens the outcome of the return generating process.

This study selected 65 days (13 weeks) when compared to Murie's (2014) 60 days (12 weeks), Afego (2013) and Cata's (2015) 100 days (20 weeks) beta trailing window period. This study and Cata's (2015) market return proxy is beta-adjusted which is in contrast to Kornik (2005) and Murie (2014) because they found betas to be too unstable, thereon, assumed a beta of one.

6.2.2 Estimation of parameters

The literature argues that the market return or optimal portfolio/individual securities fluctuates because of unstable estimates which affect the income-generating process (ie model outcome). Perhaps the correct selection of the sampling period can normalise the unpredictable nature of the parameters to effectively capture the extent of the spontaneous nature of the investor behaviour as reflected in the price reaction. The continuous information access and consumption develop into an investor appetite and /or attitude to be reflected in the security price movements during the selected estimation period. The shortened estimation period of 65 days is expected to capture the recent market sentiments and improves beta estimation accuracy. The assumption must be that the consumption patterns reflect the investor sentiments which is a continuous effort of active institutional or collective investors to participate in the security pricing or valuation in and around news release.

6.3 THE IMMEDIATE REACTION TO TRADING STATEMENT RELEASES

6.3.1 Market reaction to and in anticipation of unexpected earnings releases

The researcher examines any significant reactions 5 days before the unexpected earnings release date to observe security price movements in the direction of the news. The presumption is that the unexpected earnings news is unanticipated and the content therein could not have imagined or was unforeseeable by the market participants. The test attempts to ascertain if any information leakage or just a simply legitimate information dissemination.

The sampled firms are grouped into 'good' and 'bad' new portfolios according to the information which we wish to observe being impounded into the security prices. The API for sampled firms' portfolio is calculated by averaging the APIs of the companies which are included in the portfolio.

The API statistic captures any information leakage or legitimate information dissemination from period -k to period -1, the effect of the release at period 0 and post-release drift, ie from period 1 to period p, when the market is trying to digest the information. The formula originally adapted from Ball and Brown, 1968 and Skerratt (2002) as follows

$$API^{good}\ T \cdot \frac{1}{nl} \cdot \sum_{i.1}^{nl} \left[\prod_{t..k}^{T} \left(1 \cdot e^{good}\ i,t\right) \right]$$

$$API^{bad}\ T \cdot \frac{1}{nl} \cdot \sum_{i.1}^{nl} \left[\prod_{t..k}^{T} \left(1 \cdot e^{bad}\ i,t\right) \right]$$

Figure 2: The API for a portfolio of sampled firms

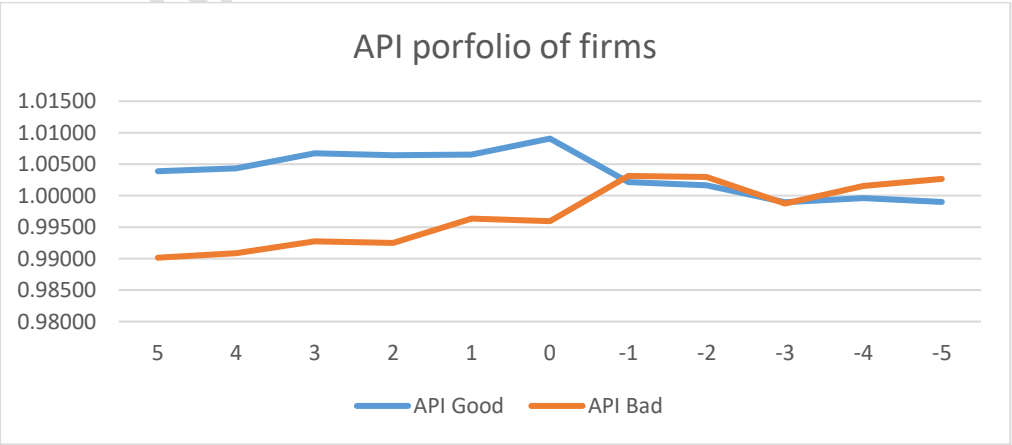


Table 2: The API spreadsheet calculations for 'good' and 'bad' news portfolio

Good News Portfolio							
	A		B	C	D	E	Formula for API
Column D	Period		Sj equity return	Market return	Average AR	API Good	Formula
12	5	P	0.28606	0.32862	-0.04256	1.00388	(1+D12)* D11
11	4		-0.10612	0.16135	-0.26747	1.00436	(1+D11)* D10
10	3		0.01040	-0.03326	0.04367	1.00672	(1+D10)* D9
9	2		0.27964	0.27452	0.00512	1.00643	(1+D9)* D8
8	1		-0.13883	0.15751	-0.29634	1.00652	(1+D8)* D7
7	**0**	**0**	**0.92737**	**0.08930**	**0.83807**	**1.00906**	**(1+D7)* D6**
6	-1		0.10340	0.03814	0.06526	**1.00214**	(1+D6)* D5
5	-2		0.48704	0.15277	0.33427	**1.00165**	(1+D5)* D4
4	-3		0.12498	0.20220	-0.07722	0.99896	(1+D4)* D3
3	-4		0.35496	0.27973	0.07523	0.99961	(1+D3)* D2
2	-5		-0.24853	-0.12855	-0.11998	0.99900	1+D2
1		-k				1.00000	1.00000

Bad News Portfolio							
	A		B	C	D	E	Formula for API
Column D	Period		Sj equity return	Market return	Average AR	API Bad	Formula
12	5	P	0.14576	0.11371	0.03205	0.99015	(1+D12)* D11
11	4		-0.09292	-0.00390	-0.08661	0.99087	(1+D11)* D10
10	3		-0.00307	-0.02595	0.02288	0.99275	(1+D10)* D9
9	2		0.00681	0.22852	-0.22171	0.99246	(1+D9)* D8
8	1		0.07249	0.10859	-0.03610	0.99636	(1+D8)* D7
7	**0**	**0**	**-0.54690**	**-0.14248**	**-0.40442**	**0.99593**	**(1+D7)* D6**
6	-1		0.21909	0.20866	0.01043	1.00313	(1+D6)* D5
5	-2		0.31735	0.10272	0.21463	1.00295	(1+D5)* D4
4	-3		-0.24903	-0.10410	-0.14493	0.99877	(1+D4)* D3
3	-4		-0.16378	-0.11269	-0.05109	1.00156	(1+D3)* D2
2	-5		0.26812	0.13008	0.13803	1.00265	1+D2
1		-k				1.00000	1.00000

Table 2 and Figure 2 suggest the market has either anticipated or there was information leakage of private information on the 'good' news portfolio of sampled firms two days prior to release. However, for a 'bad' news portfolio it appears the market signal substantially updates the market's information, therefore, 'earnings surprise' contains significant information.

6.3.2 Security price news releases and direction movement

Kornik (2005) in rationalising the impact of earnings on the security price in the context of using future cash flows to measure the security intrinsic value when pointing out that in the short interval the differences are noticeable. And that in the short-run earnings are inevitably an imperfect measure of value to the investor because the information content is very uncertain (Kornik, 2005). The thing is, what gives value to any information is knowing that it exists and accurate. Please check the previous sentence The information relevance gets its impetus from how the market resolves to use it, either to confirm what is already known or used to predict what is likely to happen next in the context of other sources of information. There will always be a strong link between current and future earnings, and current and future cash flows, therefore, it will always be very relevant and useful in assessing the security value.

The summary results are as follows, the mean (average) return on 'good' and 'bad' news are 0.96483 and -0.58796 with ARs of 0.90716 and -0.47351, respectively. The total return is 0.38407 and CARs of 0.43365, therefore, all sampled firms' security prices are positively skewed in line with the trading statement news signs. The rationale of the market information efficiency is that there no ARs earned in the market on the release of earnings news. This suggests that these initial market responses to unexpected earnings are inconsistent with semi-strong form market efficiency.

A further breakdown analysis reveals that in 102 event dates based on upward price movement, a total of 78 'good' (24 'bad') news portfolios resulted in total returns of 1.82802 (-0.44942), model expected returns of 0.16633 (0.00696) and abnormal return of 1.66169 (0.45638). Whereas on the other 70 event dates based on a downward price movement, a total of 42 'good' and (28 bad) news portfolios resulted in a total return of -0.85959 (-1.03737), model expected returns of -0.10506 (0.10748) and abnormal return: -0.75453 (-0.92989).

In summary, the presented simple arithmetic results provide for the effects of the new information (ie a sign of unexpected earnings / 'earnings surprises') in trading statement releases and the associated sign of abnormal returns. The security price direction in 106 event dates (ie 78 up and 28 down price movement) was associated with the sign of the news. The total security returns sign (+-) in 106 (62%) of the 172 event dates were in line with the sign of unexpected earnings / 'earnings surprises' in support of the overall news price direction. Whereas, the total security returns sign (+-) in 66 out the 172 event dates (38%) observed the price movement contradicted the 'good' and 'bad' news sign.

Under section 3.6 (above) the study considers other possible situations or factors that might have caused the security price to move opposite the news sign such as trading halts, commodity circle, general retailers sub-index, and analyst forecast publications are discussed. The investors' consideration of such other factors may have contributed to the 66 instances or event dates (38%) occurrences. This might be a strong indication of the investor consideration of a combination of micro and macro-economic factors in decision making. The investor access to these different information systems or platforms and consistent use of the generated information captures the short and long-term view of the arrived at a decision.

Table 3: the sign of unexpected earnings is positively correlated with the sign of abnormal security returns

	Abnormal Returns		
Trading Statement - portfolio sign	**AR (+ve)**	**AR (-ve)**	**Totals News**
Good news	69 (40%)	51 (30%)	120 (70%)
Bad news	23 (13%)	29 (17%)	52 (30%)
Total AR sign	92 (53%)	74 (47%)	172 (100%)

In a total of 98 (57%) event dates the sign of trading statements was associated with the sign of ARs. Whereas, in 74 (43%) event dates the opposite is true. The predictive information derived here is that there is an almost 50/50 chance that news and ARs signs are the same. Although Cata (2015) cautioned on the interpretation of the hypothesized association to emphasize the fact that this hypothesis is agnostic on the causal link between trading statements and share returns. The evidence suggests it is not certain that an (a) investor (fund manager) can use the initial reaction to trading statement releases to predict the sign of abnormal return on the release date. After ascertaining, on the release date, that an AR is generated with almost 50% prediction certainty of the sign, therefore, the direction of AR. This finding is critical in how we interpret the research results together with the observed model accuracy evidenced by almost zero average abnormal returns of 0.00252. However, the size of unexpected earnings is positively correlated with the magnitude of cumulative abnormal security returns of 0.43365 on the release date.

6.3.3 The effects of unexpected earnings on security prices

The outcome of this event study confirms not only the relativeness of the JSE market efficiency to other emerging markets but also the length of time it takes for the price adjustment process to complete.

In making inferences about the market efficiency Fama (1991) points to the main obstacles of the seriousness of the joint-hypothesis problem. This is the market efficiency, it can only be tested with some model of equilibrium such as the asset-pricing model (Fama, 1991). He further states that to test whether the information is properly reflected in security prices can only be conducted in the context of a pricing model that defines the meaning of "properly". Since security prices adjust to various sources of information it therefore prudent to adopt a model that addresses the extent of the reasonableness of the new information in the context of the JSE market.

This study adopted a two-factor model (Van Rensburg, 2002) to immediately measure whether the market sentiments of the sizeable investors are fully reflected in the security price. A five-step process in section 4.2 was followed to eliminate the correlation between the two predictive variables. In ascertaining if any information is lost or left behind the modeling process requiring the study uses the Akaike Information Criterion (AIC) to test for the quality of statistics. It examines the extent of the reasonableness or sensitivity of the information contained in the trading statements which the market had synthesized into share prices.

The study can reasonably conclude that security price adjustment incorporates various kinds of information (Fama, 1991) as evidenced by the price reaction contrary to the trading statement news sign. Section 6.3.1 indicates that in 66 out of a total sample of 172 events the price movement contradicted the ‘good’ and ‘bad’ news sign. Although, the focus of the study is not to identify the effect of various kinds of information on the trading statement releases, however, the reaction contrary to news sign indicates a strong presence of investor consideration of other forms of information that may include a combination of micro and macro-economic factors. This supports Fama’s (1991) view of a weaker and economical more sensible version of market efficiency where prices reflect information to the point where the profits made of acting on information exceeds the information and transaction costs (Jensen, 1998).

Cata (2015) stated that “the new information should, therefore, lead to a reassessment of individuals’ beliefs and expectations of the likelihood of alternative outcomes.” Also, Beaver (1968) argues that new information must be sufficiently material to induce a change of

expectation to be reflected in the changes to equilibrium prices. The new information must be sufficiently material when compared to the existing other various kinds of information from other timelier sources of information.

When considering the above definition and Murie's (2014) finding the trading statement releases do not entirely contain unexpectedly new and material information. In other words, the publication is in addition to a circle of continuous production of new information that affirms (strengthen) or contradicts (weakens) the functioning of the existing various kinds of information. There will always be continuous contributions to the information ecosystem through new corrective and additive market information The assumption is that the effect is from the continuous consumption of new kinds of market news by a collection of active individuals and /or institutional investors. Hence, the materiality factor leads to a reassessment of beliefs and expectations with such changes reflected in security prices.

6.3.4 The association between trading statement release and security returns

The study adopted a Model 3 market association criterion on the security return estimation in measuring short-run market reaction to the earnings announcement (Foster et al.,1984). The market association criterion uses security price movement in identifying information transfers associated with earnings releases to capture the security return. The results give an effect in answering a question on whether trading statement releases contain new and sufficiently material information to induce changes to investors' optimal portfolio holdings (Beaver, 1968).

Refer to section 6.3.1 and Table 3 (above) in measuring the sign and magnitude of the 'earnings surprise' together with the associated sign and magnitude of abnormal returns. Below are statistical answers where it is expected that a greater number of t-values fall within the expected t-values, that is, closer to 0 or less and /or greater than the critical values (left or right tail). The rejection region indicates that the t-statistic values within the acceptance region and p-values are greater than alpha (p>0.05).

The study found statistically significant abnormal returns (ARs) associated with trading unexpected earnings or 'surprise earnings' providing the required evidence that trading statements contain new and sufficient materially information, in the period surrounding the releases. The hypothesis tested is as follows:

- H_0: (AR_0| *trading statements*) = 0
- H_1: (AR_0| *trading statements*) ≠ 0

The observed days' variation captures the pre- and post-event short-run market reaction to release to unexpected earnings news. The computed daily ARs consist of a combination of four variations representing window periods, namely [-2, 0], [0, 2] and [-2, 2] and [3, +5]. The use of daily data is meant to isolate other market events such as analyst earnings estimate publication, commodity price circle, retail sales announcement and halted stock in anticipation of other sensitive information (ie other pending announcement or corporate event). These events from other macroeconomic and /or firm-specific announcements are price-sensitive and occur throughout the year.

In testing for the effects of the information content of releases and to improve the informativeness of the analysis the average cross-sectional abnormal returns used aggregates across the N announcements and were certainly different from zero but are not very significant (Kothari and Warner, 2007).

$$\overline{AR_{it}} = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \qquad CAR_{it} = \sum_{i=1}^{N} \overline{AR_{it}}$$

$$\therefore \boldsymbol{\overline{AR_{it}} = 0.00252} \qquad \therefore \boldsymbol{CAR_{it} = 0.43365}$$

Theoretically, the expected average abnormal returns of security are zero. The ascertained results are not significantly different from zero on the release date, however, under the null hypothesis H_0: (AR_0| trading statements) = 0. Although not significantly different from zero the trading statements releases contain new and sufficient materially information. The prediction is that the new information contained in the news releases, however, insignificant will not be quickly reflected in the security prices, thus leaving room for statistically significant ARs generated on acting on the unexpected earnings or surprise earnings. This is against the rationale of the semi-strong form market efficiency where there are no ARs earned in the market on the release of earnings news.

$$t_{AR} = \frac{\overline{AR_{it}}}{\sigma(AR_t)/\sqrt{n}} \qquad t_{CAR} = \frac{CAR_{it}}{\sigma(CAR_t)/\sqrt{n}}$$

$$\therefore \boldsymbol{t_{AR} = 0.35464} \qquad \therefore \boldsymbol{t_{AR} = 0.79290}$$

Furthermore, the t-statistic values of the cross-sectional and time-series aggregation abnormal returns (ie n – no. of firms) are statistical not significant, however, under the null hypothesis H_0: (AR_0) / (CAR_0) = 0. The calculations are determined as follows: $\overline{AR_{it}} = 0.00252$, $\sigma(AR_t)$ = 0.03721 and $\sqrt{28}$ (number of sampled firms) and $CAR_{it} = 0.43365$, $\sigma(AR_t)$ = 2.89399 and $\sqrt{28}$. A test of mean ARs and CARs against zero resulted in a total sample of $t_{AR} = 0.35464$ and $t_{CAR} = 0.70290$ different from zero. Kornik's (2005) initial argument was that ARs should rather be tested against the percentage of $t_{AR} = 0.35464$ and $t_{CAR} = 0.79290$ as in this study results instead of the expected zero AR. Although he concedes that this view is statistically incorrect, this argument presumes that the total sample ARs must be zero. This view cannot be possible where the total sampled firms' security price movement is positively skewed in line with the trading statement news sign. The hypothesis H_0: (AR_0) = 0 is rejected although the results do not appear to be materially different from the total sample expected zero AR. It is explained further below.

Table 4 below is the result of a two-factor unexpected earnings model with a mean ARs and CARs and t-statistics for the 'good' and 'bad' news portfolios over the window period of [-5, +5]. The average abnormal returns (ARs) differ from the target mean of zero except where marked with an asterisk. It is conspicuously clear that 'good' and 'bad' news portfolios are inclined to have positive and negative average ARs over observed variations in days [-5, +5]. Whereas, 'good' ('bad') news portfolios overwhelmingly show a positive and negative average CAR post-release over the observed variations in days [-5, +5].

However, there is a noticeable observation of a less significant magnitude of cumulative abnormal returns (CARs) in the periods prior and after trading statement releases. This perhaps could have been well as a result of the model accuracy referred to in section 6.2 (above). The accuracy of the parameters was a result of a shortened estimation period of 65 days capturing the recent market sentiments as reflected in the data this improved the beta estimation accuracy.

The selected methodology and the application (refer to chapter 4, notable 4.2) thereon surgically removed the market microstructure noise stemming from high-frequency stock price data. The intraday observations (ie prices) where a potential for high-frequency price data is likely were only selected for releases after 9:15 but before 16:45. The discreteness of security prices or intra-day price volatility can cause estimation of some parameters (e.g. realized volatility) to be very unstable.

Table 4: Average cumulative abnormal returns around trading statement release dates

Day	Good News Day mean AR (%)	Good News Average CAR	Good News t-stat	Bad News Day mean AR (%)	Bad News Average CAR	Bad News t-stat	Event window
-5	-0.0010	-0.0010	-0.5359	0.0027	0.0027	0.3614	[-5, 0]
-4	0.0006	*-0.0004	0.9939	-0.0010	0.0017	-0.4236	
-3	*-0.0006	-0.0010	0.6676	-0.0028	-0.0011	-0.3306	
-2	0.0028	0.0018	0.5596	0.0041	0.0030	0.4679	[-2, 0]
-1	*0.0005	0.0023	0.1465	*0.0002	0.0032	0.9795	
0	**0.0070**	**0.0093**	**0.1924**	**-0.0078**	**-0.0046**	**-0.2781**	[0, 0]
1	-0.0025	0.0068	0.5635	*-0.0007	-0.0053	0.2812	
2	*0.0000	0.0069	**1.0375	-0.0043	-0.0095	0.7578	[0, 2]
3	*0.0004	0.0072	-0.1283	0.0004	-0.0091	-0.0490	
4	-0.0022	0.0050	0.4177	-0.0017	-0.0107	-0.0193	
5	*-0.0004	0.0047	0.9843	*0.0006	-0.0101	0.2839	[0, 5]

*** Almost zero average ARs. ** Statistically (not very) significant**

The results on the above table provide a compelling argument that other timely sources of information have already been factored into security prices before unexpected earnings releases outside the observed window period of [-5; +5]. Although the study focuses on the short term the evidence in the magnitude of the average CARs and non-significant t-statistics suggest investor uses other timelier sources of information.

The argument that the market already impounded other timelier sources of information into the security price can only be evidenced to the extent of the observed size of the mean ARs before and after trading statement releases. The absence of potential profiting on and after the release date suggests that the market utilizes other timelier sources of information available in the market to revise security valuations (Murie, 2014). Information contained in trading statements is not 'completely' but partly new, however, sufficiently material to the extent it leads to a reassessment of individuals' beliefs and expectations The study agrees with Murie's (2014) view that information contained in the trading statements may not be 'completely' new, therefore, not entirely a timely source of information.

We argued that the multi factor-model as identified by Dr. Holman (2018) provides us with not only the explanatory power of why about 85 to 90 percent of market information is impounded into the security prices pre-event date but provide for an opportunity to improve on the true return generating process (Van Rensburg, 2002). This should tell the reader that the security fairly prices to the extent of the absent completely new market information. But most importantly the veracity of any security price-sensitive information is at most (quantity – how

often) strongly accompanied at best by the quality of information captured through these multi-factors.

6.3.5 Post releases but preceding the actual earnings announcement

In figure 3 (below) is the results of the investigation into the post-trading statement releases drift anomaly through the examination of the sign of unexpected earnings or 'earnings surprise' and, the sign and size of the mean ARs. From figure 3 a post-trading statement release drift anomaly is observable together with a correlation between 'good' and 'bad' news portfolios and, sign and size of the mean ARs.

In this study on average, the releases followed earnings announcement by 15.6 days when excluding outliers increased to 17.5 days inclusive of all days, however, Murie, (2014) is 9 days and (Cata, 2015) is 13 days. The study focuses on a short-term window period of [-5; +5] and the study unexpected earnings model or measures of [-2; +2] period. The study presupposition is that since these events are independent of each other the knowledge of the occurrence of the earlier is unlikely to influence the outcome of the latter.

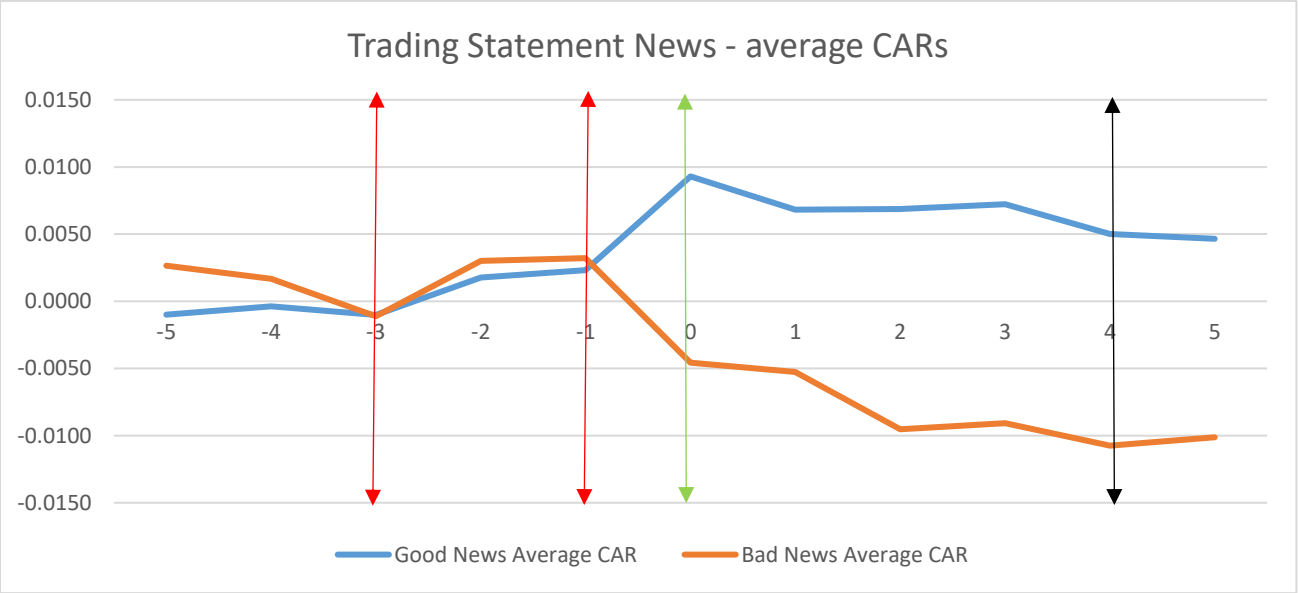
In figure 3 below, drift post drift of [1; +5] flattens out, this could sustain the argument by Murie (2014) that investors adjust their expectations to the level of the news and thereon wait out for the confirmation of the occurrence later event, ie earnings announcement. The argument here and in previous studies is that post-release drift violates the efficient market theory is sustained.

However, the researcher goes further to say, immediately, after investors applied their minds to the new and sufficiently material information immediately adjust their expectations (ie re-affirm, accept or reject their market perspectives) to the 'new' sentiments. This adjusted or new or aligned market information or sentiments as measured by the magnitude and /or extent (drift) of investor reaction or lack thereof is just another occurrence in the information cycle now reflected in the security prices. A window period of [-5; +5] is enough to observe a complete market reaction cycle to the news, thereon, security price reflective of the 'new' market sentiments.

Had the price movement converged towards zero average ARs immediately after, say [1; +5] days variation could have meant that either the investor correction of the initial reaction has taken place soon enough or other new information emerged or other 'priced' factors began to weaken the 'new' expectation.

There is an unusual spike on the -3 day on the 'good' news portfolio just before the trading statement released while the 'bad' news portfolio begins to flatten on -2 day eventually plunges on -1 day, whereas, 'good' news spoke even further. The investors' reaction two days preceding the trading statement release could suggest information leakage of material and non-public information (Kornik, 2005 and Cata, 2015). On day zero 'good' news is at its highest points and beyond that point, on average, flattens out, however, 'bad' news drift downwards and began to flatten on day 4. This downward drift explains the negative effect of 'bad' news.

Figure 3: Trading days relative to the trading statement release date – average CARs of 'good' and 'bad' news portfolios



The efficient market hypothesis suggests that price-sensitive information is instantaneously impounded into the security price. The security prices immediately adjust to the extent of completely new market price-sensitive information according to semi-strong form market efficiency. This is evidenced when no statistically significant mean ARs, CARs and no post-earnings drifts (ie CARs) or if any post CARs must be random.

The observation of a post-release security price drift, referred to as post-earnings drift, contradicts the market efficiency theory. Although the outcome of the mean ARs and CARs are not statistically significant, however, violates the null hypothesis H_0: $(\mathrm{AR}_0) = 0$, therefore, the study rejects the presumption of nil ARs. Again, this must suggest that, firstly, releases contain partly new and to such extent the timely source of information, and that investors use other timelier sources of information as shown by a lack of statistically significant mean ARs.

This creates a situation where strategies can be devised in and around news publications and a decision taken based on the information and transaction costs. The opportunity to devise a trading strategy on releases must be contrary to the assertion of the efficient market hypothesis.

Table 5 (below) the asterisks represent statistical significance at the 5% level (two-tailed) of significance. The deciles are formed based on an unexpected earnings model or measures. The study used Model 3 of the market association criterion for the security return estimation (Foster et al. 1984).

Table 5: Earnings anomalies: post-announcement security price drift

Table 5
Cumulative Average Residuals for Forecast Error Portfolios: Days [-2] to [+2] in four variations
Source: Foster, Olsen and Shevlin (1984)

Decile		Model [-2, 2]	Model [-2, 0]	Model [-1, 0]	Model [0, 1]	Model [0, 2]
Model (most positive)	10	***5.55**	***4.03**	***3.44**	***3.48**	***3.59**
	9	***3.42**	***2.55**	**1.66**	**1.74**	***2.24**
	8	1.74	1.17	0.89	0.70	1.32
	7	0.71	0.70	0.64	0.53	0.38
	6	0.12	0.29	-0.12	-0.20	-0.06
	5	-0.11	-0.48	-0.31	0.21	0.06
	4	-0.50	-0.06	0.22	0.60	-0.05
	3	-1.13	-0.05	0.06	-0.94	-1.31
	2	***-2.31**	**-1.33**	**-1.09**	**-1.28**	***-2.11**
Model (most negative)	1	***-4.85**	***-3.79**	***-3.42**	***-3.56**	***-4.16**

Source: Foster, Olsen and Shevlin (1984)

The table above divided the observations into 10 different deciles in a descending order based on the size of unexpected earnings from most positive to negative. The tenth decile consists of 10 firms, namely TBS, ABG, AMS, APN, CPI, KIO, MNP, PSG, SLM and SOL. These firms belong to the ICB super-sector that ranges from Banks, Basic resources, Health care, Paper, Financial Services, Insurance, Oil and Gas to Food retailers. The ninth and eighth decile consists of 22 and 18 firms out of 28, respectively.

An investor can devise a long and short trading strategy based on the 10 and 9, and 2 and 1 deciles over the five trading days in and around the release date. The model 3 drift evidenced in table 5 (above) for mentioned deciles is in stark contrast to Kornik's (2005) findings, thereon, view that the return based unexpected earnings measures (ie models 3 and 4) may be inaccurate. He correctly pointed out that the security returns based on unexpected earnings measures are expected to provide for a reliable indication of the market's true earnings expectation. A different but most sensible conclusion that Kornik (2005) could have made

since no observed models 3 and 4 drift was that the outcome suggests that the market is efficient and that models 3 and 4 are a true measure, although, a drift was expected.

Kornik (2005) mentioned other arguments that may favor the market efficient proposition, namely: inadequate models used to estimate ARs and unexpected earnings, used CAPM beta and that observations are time-period specific. These arguments are completely rejected insofar as the pool of studies conducted not only in recent times and to date in the context of JSE.

It could be argued that there must be some complexes to the matter than just mere differences in unexpected earnings models or measures adopted because the information is generated within the context of a universe of many other attributable priced sensitive factors as mentioned in Dr. Glen Holman's (2018) 10 multi factor-model in the context of SA. At this moment you could strongly argue that certain security 'priced' sensitive factors are better captured by certain types of differently adjusted models.

6.3.5 The association between the sign of unexpected earnings and abnormal returns

The sign of unexpected earnings or 'earnings surprises is based on the hypothesized causal link between the sign of the 'good' and 'bad' news portfolios based on the sign of trading statements content and the consequent sign of abnormal returns (Cata, 2015). In Figure 3 (above), the pre and post-releases depict not the effect of the new and sufficiently material information on the security price but the direction of the movement (ie upwards or downwards) against the sign of the 'good' and 'bad' new portfolios. Figure 3 (above) depicts at least in the short run the investors appear to have adjusted their expectations to the partly new and other timelier information as appears to maintain its dominance over other priced multi factors as shown by the drift anomaly.

The study further investigates the pre-release period using the Abnormal Performance Index (API) to understand the reaction, in the direction of the news, of security prices in the short run. The pattern of pre-releases reaction in figure 3 cannot be a confirmation of the investors' use of other timelier sources of information to inform their investment decision making but a reaction in anticipation of what is likely to happen next (i.e. day zero). Throughout the study observation of the security price movement in [-3; -1] days may suggest the inclusion of the new information which will affect the magnitude of the cumulative abnormal return in the short run.

The tables below (table 6; 6.1 and 6.2) provide for exploratory analysis of the relationship between the sign of 'good' and 'bad' news portfolios and CARs over the [1; 2] and [3; +5] periods after trading statement releases. The degree of association is measured by a combination of chi-square, albeit not a powerful test, hence a one and two tail t statistic tests with varying outcomes. The hypothesis tested is as follows:

- H_0: ($u_{1-}\, u_2$| trading statements and CAR) = 0 - the sign of trading statement releases and the sign of CARs are independent
- H_1: ($u_{1-}\, u_2$| trading statements and CAR) ≠ 0 - the sign of trading statement releases are associated with the sign of CARs

Tables 6 and 6.1 chi-square statistic calculations marked with * indicate that the null hypothesis of no association cannot be rejected at the 0.05% level of significance. However, when marked with ** provide evidence (in bold) of a statistically significant relationship between the sign of unexpected annual earnings classified according to trading statement releases and CARS. The results of a p-value of 1, as indicated with *, suggests that the results are not significant at p < .05. Where the p-value is .00001 marked with two asterisks (**) shows no uniform variance at p-value > 0.05 to reject the null hypothesis of no association. The results show no relationship between the sign of unexpected annual earnings and the average AR over the day variation of [1; +2] for bad and [3 to +5] for good news post-release period. Table 6.1 window periods of [1 to 2] for 'good' and [3 to 5] for 'bad' news portfolio, the null hypothesis is rejected for reasons as indicated in table 6.

In summarizing the results in tables 6 and 6.1 suggest in the short run for 'good' news portfolio in window period [1 to +2] the markets welcome good news but quickly lose momentum as demonstrated in [3 to +5]. The opposite is very true for the 'bad' news portfolio. The market is neither pessimistic nor optimistic which is rather very curious noting previous studies. The view is in contrast to Knight's (1983) and Kornik's (2005) findings of asymmetric reaction in favor of good news hence concluded that the market is pessimistic in its earnings expectations. However, as indicated in previous studies chi-square test is not a powerful test, hence, a t-test statistics is performed below.

Table 6: Test of association between the sign of unexpected earnings and CARs (Ball and Brown, 1968) summary

Chi-Square Test Result (APA) – Good and Bad News ARs			
Trading Days	**Observation**	**X Squared Test**	**P-Value**
5	172	44.19	*1.00000
4	172	**-5.18**	**.00001
3	172	10.00	*1.00000
2	172	**-6.91**	**.00001
1	172	7.12	*1.00000
0	172	**-24.38**	**.00001
-1	172	-3.99	**.00001
-2	172	15.20	*1.00000
-3	172	-2.01	**.00001
-4	172	5.88	*1.00000
-5	172	-1.26	**.00001

Table 6.1: The association of 'good' and 'bad news and CARS sign

Chi-Square Test Result (APA) - CARs				
Trading Days	**News**	**Observations**	***x^2 stat***	**P-Value (<0,05)**
1 to 2	Good	239	-10.628	**.00001
1 to 2	Bad	103	10.841	*1.00000
3 to 5	Good	359	65.835	*1.00000
3 to 5	Bad	155	-16.823	**.00001

***The P-Value is 1. The result is not significant at p < .05.**
****The P-Value is < .00001. The result is significant at p < .05.**

Table 6.2: T-tests for CARs [+1; +2] and [+3; +5] for 'good' and 'bad' news portfolios based on the sign of trading statements.

T-test summary (1 to 2)		
'Good'/ 'bad' news portfolio	**Good**	**Bad**
Average CAR (1;2)	-0.0012	-0.0025
Observations	103	239
t-stat	0.492	0.296
t Critical one-tail	1.651	1.660
p-value < 0.05 = Reject (No)	0.311	0.384
t-stat	1.124	0.728
t Critical two-tail	1.965	1.972
p-value < 0.05 = Reject (No)	0.262	0.468

T-test summary (3 to 5)		
'Good'/ 'bad' news portfolio	**Good**	**Bad**
Average CAR (3;5)	-0.00074	-0.0002
Observations	359	155
t-stat	0.4558	0.0895
t Critical one-tail	1.6491	1.6548
p-value < 0.05 = Reject (No)	0.3244	0.4644
t-stat	0.797	0.118
t Critical two-tail	1.963	1.968
p-value < 0.05 = Reject (No)	0.426	0.906

Tables 6.1 and 6.2 for ‘good’ and ‘bad’ news portfolios are based on observation within the days’ variation of [1 to 2] and [3 to 5]. Table 6.2 results show that the null hypothesis of no association classified according to the sign of the trading statement and the CARs cannot be rejected at the 5% significance level. The t-test in table 6.2 here and table 3 chi-squared results of Cata’s (2014) found no evidence of a relationship between the sign of news and CARs post-release period on [2 to 5] window period. In this study, however, the presentation of the chi-squared results in table 6.1 is different from Cata’s table 3 as it splits ‘good’ and ‘bad’ news portfolios and with days’ variation of [1 to 2] and [3 to 5].

Murie’s (2014) t-test conducted based on days variation of [-2 to 1] and [0 to 1] gave mixed results with CARs significantly greater than zero for ‘good’ news portfolio, however, the opposite is true for ‘bad’ news portfolio. The summation of this study’s t-test results is that both ‘good’ news and ‘bad’ news portfolios the CARs were not significantly greater or less than zero as expected.

In conclusion, the initial market responses to ‘earnings surprises’ cannot be used to predict the future sign of abnormal returns irrespective of mixed outcomes. However, the evidence is not enough to suggest that this phenomenon is completely inconsistent with semi-strong form market efficiency and the study focus is short term of [2 to 5] window period as opposite to Cata’s (2015) of [2, 15]. Murie found a strong and negligible correlation over the (3;+60) for ‘good’ and ‘bad’ post-release, respectively. The biggest differentiator of these studies is the use of different market proxies with Kornik (2005), Zheng (2007) and Murie (2014) presumed a beta of one whereas Cata (2014) and in this study used beta-adjusted for systemic risk to measure abnormal returns. Some of Murie’s (2014) assertions of phenomena of survivorship bias of sample firms, a bullish market over the 2010 to 2013 period and the effect of JSE’s Top 60 small market capitalization cannot be sustained based on the study results.

6.3.6 The magnitude of firms’ unexpected earnings and the abnormal security returns

The rationale here is that trading statements contain new and sufficient material information causing the investor to react in seeking to integrate this information into security price. The expectation is that the greater the ‘earnings surprise’ the larger the security price movement in and around releases date. The association of the magnitude of firms’ share price reaction to unexpected earnings measures and the size of abnormal security returns is investigated. The methods applied are table 6 (above) grouping of the total sample of observations into quintiles and linear regression analysis as follows.

$$y_i = \alpha + bx_i + \varepsilon_i$$

Where:

- y_i is the cumulative abnormal return over the period surrounding the trading statement announcement.
- x_i is the expected earnings measures as defined in section 4.4.3.
- b is a coefficient measuring the sensitivity of y_i to x_i.

The hypothesis tested is as follows:

- H_0: ($u_{1-}\, u_2$| trading statements and CAR) = 0
- H_1: ($u_{1-}\, u_2$| trading statements and CAR) ≠ 0

∴ No or a positive relationship exists between the magnitude of the unexpected earnings measures and CARs in the post-release period.

Table 7: The relationship between the magnitude of firms' unexpected earnings measures and size of abnormal security returns

Unexpected earnings measures →	Model [-2, 2]	Model [-2, 0]	Model [-1, 0]	Model [0, 1]	Model [0, 2]
Slope coefficient	0.0725	*0.1147	0.0281	-0.0435	*-0.1781
T-stat	0.4460	0.9478	0.2657	-0.3800	-1.2536
P-value	0.6562	0.3446	0.7908	0.7045	0.2117
Observations	172	172	172	172	172

Table 8: The relationship between the magnitude of firms' unexpected returns and abnormal security returns

Days variation	(-1; 0) Days	(-1; 1) Days	(0; 1) Days	(-2; 2) Days	(1; 2) Days	(3; 5) Days
Slope coefficient	0.0006	0.0009	0.0006	*0.0014	*0.0022	0.0010
T-stat	0.924	*1.660	0.981	*3.506	*3.533	*1.789
P-value	0.3563	0.0974	0.3273	*0.0005	*0.0005	0.0742
Observations	343	515	343	859	343	515

Table 7 represents the summary results of the relationship between the firms' unexpected earnings measures and CARs. The slope coefficients marked with an asterisk (*) reveal highly

significant unexpected earnings of greater than zero. Therefore, the slope coefficients are statistically significant for Models [-2, 0] and [0, 2]. While other slope coefficients are significant and greater than zero. This implies the null hypothesis of no relationship between the magnitude of unexpected earnings and CARs cannot be rejected, more so, for Models [-2, 0] and [0, 2]. The results on the unexpected earnings measures are in contrast with's Cata (2014) findings insofar as Models [-2, 0] and [0, 2]. However, the study outcomes of the Models [-2, 0] and [0, 2] are in line with Murie's (2014) findings, albeit, on trading days of [-2, 1]. Table 8 for [-2; +2] and [+1; +2] days variation confirms a positive relationship exists between the magnitude of the unexpected earnings measures and CARs in the post-release period.

6.3.7 The post-trading statement announcement drift

In responding to a question of any sustained association rational momentum effects of market reaction post-trading statement releases preceding earnings announcements. In section 6.3.3 figure 3 a post-trading statement release drift anomaly is observable together with a correlation between 'good' and 'bad' news portfolios and, sign and size of the mean ARs. Figure 3 observed short term [1; +5] flat CARs drift pattern is in line with Murie's (2014) [3; +60] window period but the mean ARs size insignificant. A closer look at Marie's (2014) figure 8 'good' and 'bad' news portfolios for window period [2; +7] shows no drift and CARs are in opposite direction to the news. This raises questions on the sudden drift in figure 8 (Murie, 2014) from window period [8;+60] related to the news of the release market reaction or could it be that other prices sensitive market factors are introduced in line with the release news direction to resuscitated the initial market reaction. However, the contrary is true, refer to Kornik's (2005) finding in figure 14 when an immediate reaction is observed in the direction of the new only within the [1; +5] window period.

As is confirmed in figure 3 (above) for days variation of [1; +5] there is a predictable but statistically insignificant CARs drift post-release and is correlated with the sign of the news. This observation confirms Cata's (2015) findings that CARs for all the good and bad news portfolios are not statistically significant over the various holding periods.

As previously argued that the reason for almost zero average ARs can be attributed to the accuracy of estimation parameters (ie the intercept and slope coefficients). The lack of market response/activities after the release date maybe as a result of the investor access to other timely sources of information, for example waiting to confirm the 'earnings surprise' release via the actual earnings announcements or the effect of the combination of micro and macro-economic factors on the just releases news.

The hypothesis tested is whether ARs are earned or not in the period after trading statements releases but preceding earnings announcements. The hypothesis is as follows:

- H_0: (CAR_{1+T}) = 0
- H_0: (CAR_{1+T}) ≠ 0

Table 9 below indicates that the CARs are not earned in the (CAR_{1+5}) window period after trading statements releases. The conclusion is that the initial market responses to unexpected earnings and the sign of news cannot be used to predict either 'good' or 'bad' news portfolios and ARs over the (1, 5) post-release window. The results on CARs are consistent with semi-strong form market efficiency (Cata, 2015). Also, no evidence of an association between the sign of CARs in the days' variation of [1; 2) and [3; 5] and 'good' or 'bad' news portfolios post-releases.

Table 9: Good and bad news portfolios relationship with CARs over the holding periods

Holding Period	Trading Statements					
	Good News Portfolio			Bad News Portfolio		
	Mean CAR (%)	t-stat	P-Value (<0,05)	Mean CAR (%)	t-stat	P-Value (<0,05)
1 to 2	-0.00121	*1.12371	0.26172	-0.00248	0.72753	0.46774
3 to 5	-0.00074	0.79715	0.42563	-0.00020	0.11805	0.90610

6.4 THE INFORMATION CONTENT OF ACTUAL EARNINGS ANNOUNCEMENTS

The essence of this section is to assess the relationship between post releases and investor reaction to the earnings announcement. Since the release has passed, the investor's use of that information is part of other timelier sources of information that led to a revise their JSE security valuations. In section 6.4.2 will discuss the magnitude of the post-trading statement release drift and investor reaction to the actual earnings announcement. The presupposition is that the market reaction at the time of the earnings announced is negatively associated with the magnitude of the post-trading statement announcement.

The key shortcomings of these event studies are the studys' curious observation of the tendency to treat market events in isolation of each other when assessing their effects on the security price. This assertion is very true at a micro level, ie on a piece of company-specific market-sensitive information, well, after management pronouncements or analyst publications just before or after the study event. The more pointed example is figure 8 in Murie's (2014) findings where no drift in the direction of the news is observed in the window period [2; +7] but now a sudden drift from window period [8;+60].

This links us back to the 10 multi factor-model in the SA context as identified by Dr. Glen Holman (2018) which could possibly provide us with the explanatory power of which factors are at play on and around market news under the study investigation. A manager or investor who wishes to devise a strategy and around the news have to be well informed of what constituted the 85 to 90 percent pre-event market reaction as identified by Ball and Brown (1968) supported by the findings of Ball and Kothari (1994). The knowledge of this information should tell you how strong and the duration of the trend after news releases and how to factor the information and transaction costs to profit on the trade.

The importance of this section is on the notion that upon the occurrence of a separate unexpected market event, such as releases, the market participants will wait for a specific known event to alleviate any concerns or clear any uncertainties. And, this is explained by or is the reason for the absence of statistically significant AR drift in the period after trading statement releases. The market reaction to earnings announcement and the drifts thereafter is compared and measured against the size of price movement in the post-trading statement release period.

6.4.1 The Market reaction to and in anticipation of unexpected annual earnings

Figure 4: The API for a portfolio of sampled firms – announcement

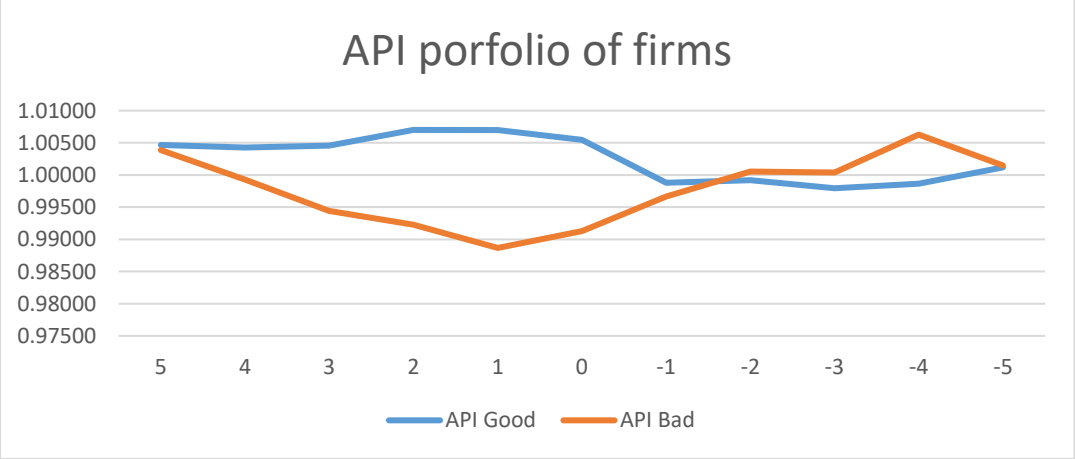


Table 10: The API spreadsheet calculations for 'good' and 'bad' news portfolio

Good News Portfolio							
	A		B	C	D	E	Formula for API
Column D	Period		Sj equity return	Market return	Average AR	API Good	Formula
12	5	P	-0.00879	-0.05364	0.04485	1.00467	(1+D12)* D11
11	4		-0.05712	-0.02363	-0.03349	1.00428	(1+D11)* D10
10	3		-0.20631	0.08246	-0.28877	1.00456	(1+D10* D9
9	2		0.10501	0.11275	-0.00774	1.00698	(1+D9)* D8
8	1		0.21146	0.03146	0.18000	1.00698	(1+D8)* D7
7	**0**	**0**	**0.83739**	**-0.01956**	**0.85695**	**1.00546**	**(1+D7)* D6**
6	-1		0.13032	0.18140	-0.05108	0.99877	(1+D6)* D5
5	-2		0.34491	0.19207	0.15284	0.99920	(1+D5)* D4
4	-3		-0.00389	0.07862	-0.08251	0.99794	(1+D4)* D3
3	-4		-0.09037	0.21446	-0.30483	0.99866	(1+D3)* D2
2	-5		0.10902	-0.03322	0.14224	1.00119	1+D2
1		-k				1.00000	1.00000

Bad News Portfolio							
	A		B	C	D	E	Formula for API
Column D	Period		Sj equity return	Market return	Average AR	API Bad	Formula
12	5	P	0.34370	0.15429	0.18941	1.00386	(1+D12)* D11
11	4		0.29574	0.07897	0.21676	0.99931	(1+D11)* D10
10	3		0.08752	0.00986	0.07765	0.99441	(1+D10)* D9
9	2		0.24245	0.04470	0.19775	0.99231	(1+D9)* D8
8	1		-0.21341	-0.07127	-0.14214	0.98867	(1+D8)* D7
7	**0**	**0**	**-0.12856**	**0.11075**	**-0.23931**	**0.99129**	**(1+D7)* D6**
6	-1		-0.12952	0.04453	-0.17405	**0.99665**	(1+D6)* D5
5	-2		0.09542	0.07886	0.01656	1.00055	(1+D5)* D4
4	-3		-0.14552	0.13996	-0.28548	1.00041	(1+D4)* D3
3	-4		0.23539	0.01828	0.21710	1.00628	(1+D3)* D2
2	-5		0.19664	0.12312	0.07352	1.00150	1+D2
1		-k				1.00000	1.00000

About 6.3.1, the opposite is true for unexpected annual earnings in table 2 and figure 2 that suggests the market either anticipated or there was information leakage of private information on 'bad' news portfolio of sampled firms a day prior to release. For a 'good' news portfolio it appears the market signal substantially updates the market's information, therefore, 'earnings surprise' contains significant information.

6.4.2 The association between unexpected annual earnings and security returns

This section analysis the security price behavior on and around earnings announcement and associated estimated AR during the time. The investor rationality, access and continuous consumption of other market news suggest a view that at least a portion of the study event information causing investors to revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) percent of market information is impounded into the security prices pre-event date. The timeliness of this information event appears to relate to the extent or lack of the investor reaction to other timelier sources of information and or completely new information.

In this section, the study determines any statistically significant ARs associated with unexpected annual earnings to provide the required evidence that the announcements contain new and sufficient materially information. The hypothesis tested is as follows:

- H_0: (AR_0| *earnings announcements*) = 0
- H_1: (AR_0| *earnings announcements* ≠ 0

The computed daily ARs consist of four days variations representing window periods of, namely [-2, 0], [0, 2] and [-2, 2] and [+3, +5]. In testing for information content and to improve the informativeness of the analysis the average cross-sectional ARs were aggregated across the N announcements and were found not very significantly different from zero but not H_0: (AR_0) = 0.

$$\overline{AR_{it}} = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \qquad CAR_{it} = \sum_{i=1}^{N} \overline{AR_{it}}$$

$$\therefore \overline{\boldsymbol{AR_{it}}} = \mathbf{0.00362} \qquad \therefore\ \boldsymbol{CAR_{it}} = \mathbf{0.61168}$$

Kornik (2005) and Cata (2014) found ARs of the total sample over the window periods not significant and equal to zero in with the study results of a total sample of $\therefore \overline{AR_{it}} = 0.00362$ and $CAR_{it} = 0.61168$. The statistically insignificant ARs on the release date provide evidence that unexpected annual earnings contain new and sufficient materially information only to the extent or lack of the investor reaction to other timelier sources of information.

$$t_{AR} = \frac{\overline{AR_{it}}}{\sigma(AR_t)/\sqrt{n}} \qquad t_{CAR} = \frac{CAR_{it}}{\sigma(CAR_t)/\sqrt{n}}$$

$$\therefore\ \boldsymbol{t_{AR}} = \mathbf{0.53127} \qquad \therefore\ \boldsymbol{t_{AR}} = \mathbf{1.11842}$$

The market reaction to unexpected annual earnings is slightly better than the trading statement releases in section 6.3.2. The t-statistic value of the average cross-sectional abnormal returns is not statistically significant but not equal to zero, therefore, reject the null hypothesis H_0: $(\mathrm{AR}_0) = 0$. The calculations are determined as follows: $\overline{AR_{it}} = 0.00362$, $\sigma(AR_t) = 0.03605$ and $\sqrt{28}$ (number of sampled firms).

Table 11: Average CARs around unexpected annual earnings release dates

The average CARs and their t-statistics are for the 'good' and 'bad' news portfolios over the event window period, classified according to the sign of the trading statement. The statistical significance is based on the 5% level (two-tailed) of significance.

Earnings Announcement							Model
	Good News Portfolio			Bad News Portfolio			
Obs.	120			52			Short Term
Day	Good News Day AR (%)	Good News Average CAR	Good News t-stat	Bad News Day AR (%)	Bad News Average CAR	Bad News t-stat	Event window
-5	0.0012	0.0012	-0.1138	0.0015	0.0015	0.4706	[-5, 0]
-4	-0.0025	-0.0014	0.7806	0.0044	0.0059	0.1144	
-3	*-0.0007	-0.0020	0.2827	-0.0058	0.0001	0.4651	
-2	0.0013	-0.0008	0.7508	*0.0003	0.0004	0.2914	[-2, 0]
-1	0.0071	0.0064	0.6064	-0.0036	-0.0031	0.2901	
0	**0.0071**	****0.0135**	**-0.0257**	**-0.0049**	***-0.0080**	**0.2785**	[0, 0]
1	0.0015	**0.0150	0.0871	-0.0029	**-0.0109	-0.2664	
2	*-0.0001	**0.0149	0.3995	0.0040	*-0.0069	0.1161	[0, 2]
3	-0.0024	**0.0125	0.2905	0.0016	*-0.0053	0.0116	
4	*-0.0003	**0.0123	-0.0988	0.0044	*-0.0008	0.3077	
5	*0.0003	**0.0126	-0.1735	0.0039	*0.0030	0.3988	[0, 5]

*** Almost zero average ARs and **CARs are different from Zero**

Murie (2014) correctly pointed out that unexpected earnings models or measures are not an information source to the market, unlike trading statement releases. Upon close inspection of Cata's (2015) table 6 a noticeable absence of asterisks sign representing a statistical significance at the 5% level (two-tailed) of the significance of ARs on trading statement news. Hence, Cata (2014) concludes that only the sign of ARs is positively related to the sign of the unexpected earnings measures or model on the earnings announcement date, albeit, a non-information source to the market as explained by Murie (2014). Rather, the ARs are not statistically significant at the 5% level of significance based but are positive and negative, respectively, on the sign of 'good' and 'bad' news portfolios

In figure 11, Kornik (2005) found a statistically significant correlation between unexpected annual earnings and ARs based on both ‘good’ and ‘bad’ news portfolios over the window period of [-2; +2] of 4.03% and 1.03%, respectively. However, the outcomes were formed based on unexpected headline EPS using the analyst’s one-month EPS forecast as expected earnings as opposed to the two-factor model or any unexpected earnings measures.

In table 13.2, the results show two-tail t-tests conducted to ascertain if the unexpected annual earnings had a significant association with the security returns for the [-5; +5] days variation period. Also, a one-tail test was used on post-earnings announcement based on [1; +2] and [3; +5] days variation to determine whether the mean ARs and CARs are significantly greater than or less than zero, respectively. Refer to table 13 (below), the mean CARs are significantly different from zero, positive for ‘good’ new and negative on bad news on both [1; +2] and [3; +5] days variation post-earnings announcement disclosures. The t-test is not statistically significant, however, it is different from zero and this suggests that earnings announcements do indeed convey information to which security prices react in the direction of the news.

The ARs for ‘good’ and ‘bad’ news portfolios are not statistically significant at a 5% level of significance and approximately zero. As a result, in line with Cata’s (2014) finding the null hypothesis of zero ARs cannot be rejected based on both the sign of trading statements and the size of ARs.

6.4.3 The relationship between post-trading statement drift and CARs in the period surrounding earnings announcements

The study already ascertained that there are other timelier sources of information, earnings announcements are timely since investors revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 percent (Kornik, 2005) before this event news. Therefore, the expected security reaction post these events amount to a minimum of 2 to a maximum of 15 percent. Kornik (2005) observed drift on both ‘good’ and ‘bad’ news portfolios of 4.03% and 1.03% over the window period of [-2; +2] on unexpected annual earnings and Murie (20014) of 1.24% and -0.22% over the window period of [+3; +60] on trading statements.

The tested null hypothesis of no relationship is supported by the analysis of prior SA studies. Noting the timeframe elapses since the last trading statement releases to earnings announcement and the fact new information is introduced into the market all the time. Then, only compelling evidence will lead to the rejection of the preposition of no relationship.

The study data show that out of 172 sampled firms 63%, 42%, and 9% published their earnings within 15, 10 and 5 days, respectively, after the trading statement release. A quick reminder that the study adopted short-term returns-based unexpected earnings measures (Foster et al., 1984) of [-2; +2] with an event window period of [-5; +5] days variation to measure the market's reaction to trading statement releases and earnings. The objective analysis dictates that no security price movement over the post-trading statement release does not influence any reaction towards the unexpected annual earnings, amongst other things, based on average the days between these events.

In section 6.3.6 that there are certainly no observable predictable rational momentum effects on ARs after trading statement releases and also only 9% of earnings announcements were within 5 days from the release date. In section 6.3.4 the study concluded that the initial market responses to 'earnings surprises' cannot be used to predict the future sign of abnormal returns.

Table 8 observed post-release statistical significant magnitude of firms' security price reaction to unexpected earnings or 'earnings surprises' of 3.506, 3.533 and 1.789 percents in the [-2; +2], [1; +2] and [3; +5] days variation provide evidence that the new information is quickly impoundment into security prices such that it will have no impact on the earnings announcement. The security price drift d led to a view that at least in the short run the investors appear to have adjusted their expectations to the new information.

In contrast to Cata (2014), the outcome suggests that investors isolate earnings events and that investors reassess their expectations and beliefs immediately to be ultimately reflected in security prices in the short run.

The market reaction at the time of the earnings announcement is expected to be negatively associated with the magnitude of the post-trading statement announcement. The tested hypothesis is as follows:

- H_0: (u_{1-} u_2| trading statements and actual earnings announcement) = 0
- H_1: (u_{1-} u_2| trading statements and actual earnings announcement) ≠ 0

Table 12: The relationship between the post-trading statement drift and the CARs

Days variation	(-1; 0) Days	(-1; 1) Days	(0; 1) Days	(-2; 2) Days	(1; 2) Days	(3; 5) Days
Slope coefficient	0.0009	0.0006	0.0002	0.0008	0.0004	0.0004
T-stat	1.366	0.994	0.281	**1.885	0.566	0.732
P-value	0.1729	0.3208	0.7786	0.0598	0.5718	0.4643
Observations	337	506	337	844	337	506

Table 12 result indicates the absence of statistically significant relationships between the post-trading statement release drift and the CARs over the [-2, +2)] window period surrounding actual earnings announcements. The above table 10 provides the results for the test of association between the magnitude of the post-trading statements drift and CARs over the [-2; +2] period surrounding earnings announcements. There is no relationship between the magnitude of the post-trading statement announcement drift and investor reaction to the actual earnings announcement.

6.4.4 The association of the sign of unexpected earnings and abnormal

The study has ascertained that the semi-strong form market efficiency doesn't hold in the context of JSE, then, the expectations are that the sign of unexpected earnings cannot be used to predict the direction of CARs over this period. The assertion tested is the effect of the 'good' and 'bad' news portfolios on the security price direction.
The tables below (table 13, 13.1 and 13.2) provide for exploratory analysis of the relationship between the sign of 'good' and 'bad' news portfolios and CARs over the [1, +2] and [3; +5] window after the earnings announcement. The degree of association is measured with the use of chi-square, one and two tail t-statistic tests with varying outcomes. The hypothesis tested is as follows:

- H_0: (u_{1-} u_2| unexpected annual earnings and CAR) = 0 - the sign of unexpected annual earnings and the sign of CARs are independent;
- H_1: (u_{1-} u_2| unexpected annual earnings and CAR) ≠ 0 - the sign of unexpected annual earnings are associated with the sign of ARs

Table 13 and 13.1 chi-square statistic calculations marked with * indicate that the null hypothesis of no association cannot be rejected at the 0.05% level of significance. However, when marked with ** provide evidence (in bold) of a statistically significant relationship between the sign of unexpected annual earnings classified according to trading statement releases and CARS. The results of a p-value of 1, as indicated with *, suggests that the results are not significant at p < .05. The results show no relationship between the sign of unexpected annual earnings and the average AR over the [1; +5] day variation post-earnings announcement period. Table 13.1 window periods of [1 to 2] and [3 to 5] for 'good' and 'bad' news portfolio, the null hypothesis is not rejected for reasons as indicated in table 13.

Table 13: Provide for the chi-square statistics (Ball and Brown, 1968) summary

Chi-Square Test Result (APA) - Average ARs			
Trading Days	**Observation**	**X Squared Test**	**P-Value**
5	172	18.58	*1.00000
4	172	6.64	*1.00000
3	172	74.12	*1.00000
2	172	38.01	*1.00000
1	172	16.44	*1.00000
0	172	147.46	*0.87146
-1	172	5.41	*1.00000
-2	172	2.63	*1.00000
-3	172	10.01	*1.00000
-4	172	**-20.16**	****.00001**
-5	172	5.36	1.00000

Table 13.1: Periods after unexpected annual earnings

Chi-Square Test Result (APA) - Average ARs				
Trading Days	**News**	**Observation**	$x^2\ stat$	**P-Value (<0,05)**
1 to 2	Good	239	35.073	*1.00000
1 to 2	Bad	97	19.385	*1.00000
3 to 5	Good	359	96.349	*1.00000
3 to 5	Bad	146	32.230	*1.00000

***The P-Value is 1. The result is not significant at p < .05.**

****The P-Value is < .00001. The result is significant at p < .05.**

Table 13.2: T-tests of CARs [1; 2] and [3; 5] for 'good' and 'bad' news portfolios based on the sign of trading statements

T-test summary (1 to 2)		
'Good'/ 'bad' news portfolio	**Good**	**Bad**
CAR (1;2)	0.0007	0.0006
Observations	239	97
t-stat	0.858	0.039
t Critical one-tail	1.651	1.661
p-value < 0.05 = Reject	0.196	0.484
t-stat	0.299	-0.063
t Critical two-tail	1.965	1.972
p-value < 0.05 = Reject	0.765	0.950

T-test summary (3 to 5)		
'Good'/ 'bad' news portfolio	**Good**	**Bad**
CAR (3;5)	-0.00032	0.00091
Observations	359	146
t-stat	0.2439	0.2337
t Critical one-tail	1.6491	1.6554
p-value < 0.05 = Reject	0.8074	0.4078
t-stat	0.393	-0.040
t Critical two-tail	1.963	1.968
p-value < 0.05 = Reject	0.695	0.968

Tables 13.1 and 13.2 for ‘good’ and ‘bad’ news portfolios are based on observation within the days’ variation of [1 to 2] and [3 to 5]. Table 13.2 results indicate that the null hypothesis of the unexpected earnings announcement is classified according to the sign of ‘good’ and ‘bad’ news portfolios and the sign of the CARs cannot be rejected at a 5% significance level. In line with section 6.3.4 under table 5.2 found no evidence of a relationship between the sign of news and CARs post-release period of [1 to 5]. This is in contrast to Kornik's (2005) and Cata’s (2015) table 8 findings that the signs of unexpected earnings can be used to predict the direction of CARs post-earnings announcement, therefore, which is at odds with semi-strong form efficiency. This study under chi-squared and t-statistics tests found no association in line with the semi-strong form efficiency. Also, Kornik (2005) table 11 chi-squared and Murie's (2014) table 4 t-statistics tests found no association for [-3; +3] line with the semi-strong form efficiency.

6.4.5 The size/magnitude of firms’ unexpected annual earnings and the abnormal security returns

The objective is to test the association between the magnitude of firms’ unexpected annual earnings and the extent of price movement post-earnings announcement. The study determines the magnitude of firms’ security price reaction to unexpected earnings announcement over [1; +5] days variation. The evidence of significant association suggests that substantial investors reassess their beliefs/expectations solely based on the size of the unexpected annual earnings. It could potentially mean the size of the unexpected annual earnings compels the investors to evaluate and act in addition to and /or above other timelier sources of information, ie the larger the information content.

The relationship is examined using the regression analysis ($y_i = \alpha + bx_i + \varepsilon_i$) to determine the relationship between the size of unexpected annual earning and magnitude of security price reaction as follows:

$$y_i = \alpha + bx_i + \varepsilon_i$$

The hypothesis tested is as follows:

- H_0: ($u_{1-} u_2$| earnings announcement and CAR) = 0 - no relationship between the magnitude of the unexpected annual earnings measures and CARs in the post-announcement.

- H_1: ($u_{1-}u_2$| earnings announcement and CAR) ≠ 0 - the magnitude of firms' unexpected annual earnings is positively associated with the magnitude of share returns.

Table 14: The relationship between the magnitude of firms' unexpected annual earnings and size of abnormal security returns

Days variation	(-1; 0) Days	(-1; 1) Days	(0; 1) Days	(-2; 2) Days	(1; 2) Days	(3; 5) Days
Slope coefficient	0.0009	0.0006	0.0002	0.0008	0.0004	0.0004
T-stat	1.366	0.994	0.281	*1.885	0.566	0.732
P-value	0.1729	0.3208	0.7786	*0.0598	0.5718	0.4643
Observations	337	506	337	844	337	506

The size of unexpected annual earnings for the selected sample of firms for the window period of [-2; +2] is fairly significantly positively related to the size of CARs. Even though the results are not convincing, the null hypothesis of no relationship between the magnitude of unexpected annual earnings and the size of CARs can be rejected at a 5 percent significance level on [-2; +2] days variation.

However, the rest of the outcomes in table 14 on the other day variation post-earnings announcement are in line with the chi-squared test with a p-value of 1 on [1; +2], and [3; +5], in tables 13 and 13.1 (above). This suggests that the overall results are not significant at p < .05 post-earnings announcement period. Both, the p-values are not p < .05 and the slope coefficient is not significantly zero as indicated in tables 13, 13.1, 13.2 and 13. In contrast to Kornik (2005) for window periods of [-2; +2] and Murie (2014) of [-2; +1], and Cata (2015) these outcomes are in line with the semi-strong form efficiency.

6.4.6 The post-earnings announcement drift

The purpose is the ascertain any observable drift anomaly on the 'good' and 'bad' news portfolios based on the sign of trading statements depicting both the sign and size. The hypothesis tested is whether the abnormal returns are earned or not in the period after earnings announcement within the [-5; +5] days variation. Based on Kornik's (2005) assertion that new information should be impounded into the security price within a week of the announcement. Using chi-square Kornik (2005) found that JSE is consistent with the semi-strong form efficiency because the new information is reflected in a security price within a week after the announcement.

The hypothesis test for any rational momentum effects of market reaction post-trading statement releases of abnormal returns within the [1; +5] days variation. The hypothesis is as follows:

- H_0: (CAR_{1+T}) = 0 - abnormal returns are not earned in the (1, T) day period after trading statement releases.
- H_0: (CAR_{1+T}) ≠ 0 - abnormal returns are earned in the (1, T) day period after trading statement releases.

Table 15: Good and bad news portfolios release date relative to CARs over the holding periods

Holding Period	Earnings Announcement							
	Good News Portfolio				Bad News Portfolio			
	AR (%)	CAR	t-stat	P-Value (<0,05)	AR (%)	CAR	t-stat	P-Value (<0,05)
1 to 2	0.00072	0.17226	0.29855	0.76541	0.00057	-0.11651	-0.06253	0.95021
3 to 5	-0.00032	0.05561	0.39278	0.69460	0.00091	0.13327	-0.03998	0.96814

Table 15 (above) indicates that CARs are not earned in the (CAR_{1+5}) day period after the earnings announcement. In tables 13 and 13.1 with a p-value of 1 indicating that the results are not significant at p < .05. Therefore, no relationship between the sign of unexpected earnings based on the sign trading statement and the CARs over the [1; +5] day variation post-earnings announcement. The results of table 15 indicate that the null hypothesis of the unexpected earnings classified according to the sign of 'good' and 'bad' news portfolios cannot be rejected at the 5% significance level. The results are in line with Kornik (2005) in table 14 of [1; +5] period and Cata (2015) in table 12 that found a lack of drift post-earnings announcement in security prices to be consistent with the JSE semi-strong form efficient.

Figure 5: Trading days relative to earnings announcement date - CARs of 'good' and 'bad' news portfolios

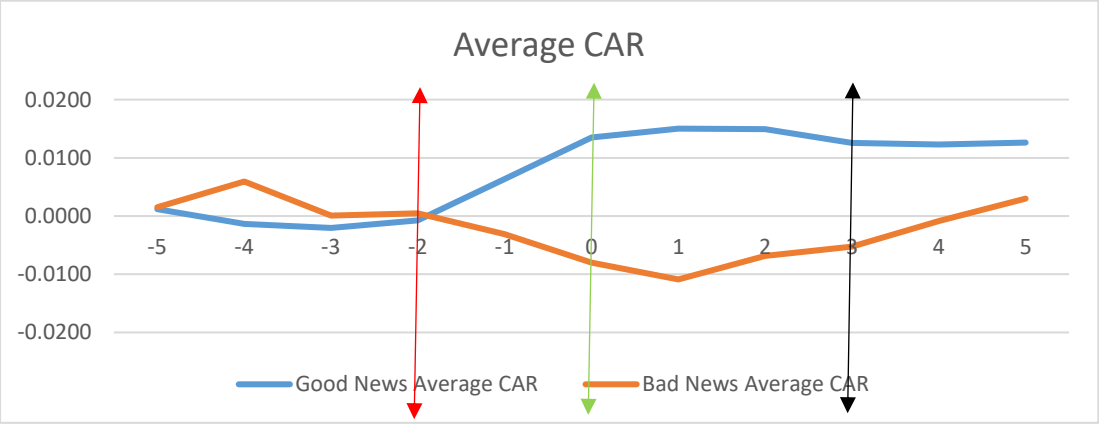


Figure 5 pre-earnings announcement investor reaction results on [-2; -1] days variation show resemblance to figure 3 in section 6.3.3, albeit for [-1; -1] on trading statement releases. The

investors' reaction two days preceding the trading statement release could suggest information leakage of material and non-public information (Kornik, 2005 and Cata, 2015). The security price drift is at a peak in [0; +1] period, thereafter, begin to descend showing a strong sign of semi-strong form market efficiency.

Although in figure 5 and table 15 (above) the mean CARs are significantly different from zero, positive for 'good' new and negative on bad news on both [1; +2] and [3; +5] days variation post-earnings announcement disclosures. But the t-statistic tests are not statistically significant at a 5% level of significance over this period casts doubt on the use of the initial response to consistently earn earnings above average normal returns. The results are consistent with Kornik's (2005) table 11 and Cata's (2015) table 10 findings of no statistically significant CARs, the investor cannot use the initial response to predict near-future ARs.

7.5 Summary of findings

The primary and secondary objective of the study was to ascertain the effects of unexpected earnings on security market prices of the JSE listed companies after cautionary and annual earnings announcements, respectively. This section summarises the results of the problem statement based on the tested hypothesis.

A reaction to trading statement releases reveals the following:

- At the news release date, the price generally moves is in line with the 'good' and 'bad' news portfolios based on the trading statement sign. The results on 'good' and 'bad' news are a return of 0.96483 and -0.58796 and CARs of 0.90716 and -0.47351, respectively. The results are consequently different from zero and significant on the release date.
- The sample average $\overline{AR_{it}} = 0.00252$ and a total of $CAR_{it} = 0.43365$ are almost and significantly different from zero, respectively.
- The statistical results are not significant at $t_{AR} = 0.35464$ and $t_{CAR} = 0.70290$ for ARs and CARs, accordingly. However, are significantly different from zero on the release date, hence, the null hypothesis H_0: (AR_0| trading statements) = 0 is rejected.
- The results are against the rationale of a semi-strong form market efficiency where the ARs earned are expected to be approximately zero in and around the market news.
- This may give an overall view that news is largely impounded into security prices well before announcements. The study already ascertained that there are other timelier

sources of information, releases and earnings announcements are timely since investors revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 percentage (Kornik, 2005) before these events.

- The study concluded that the initial market responses to 'earnings surprises' cannot be used to predict the future sign of abnormal returns.
- The timeliness of information events appears to relate to the extent or lack of the investor reaction to other timelier sources of information and or completely new information.
- There was never a contention on the continuous existence and of other timelier sources of information. It would have been absurd to think otherwise but rather the significance of trading statement news on the security price in the presence of continuous introduction of new information in the information ecosystem.
- This outcome is in line with Kornik's (2005) view that the investor reaction is a confirmation that the releases contain a degree of timely information. Therefore, the unexpected component of earnings causes a change in security prices although it resulted in statistically insignificant ARs. The reasons for insignificance are just explained below.
- Since the researcher agrees with the impact of unexpected earnings on security prices, however, the extent of the effect is a product of accurate estimation of the parameters, the unexpected measures or moded used and the size of the investor reaction is measured by the price movement on the day of news.
- The significant price movements on 'good' or 'bad' news portfolios appear to take place on intraday releases and the previous studies focused only on closing and opening price.

It is noted elsewhere, that earnings announcements are secondary to the main objective of this study, ie trading statement releases. As discussed in section 6.4 the essence was to assess whether the market reaction at the time of the earnings announced is negatively associated with the magnitude of the post-trading statement announcement. The study has also noted challenges of timeframe elapses since the last trading statement releases to earnings announcement and the fact new information is continuously introduced into the market all the time. The hypothesis tested was based on the expectation of no relationship between post releases and investor reaction to the earnings announcement.

A reaction to unexpected annual earnings reveals the following:

- At the news announcement date, the price generally moves is in line with the 'good' and 'bad' news portfolios based on the trading statement sign. The results on 'good'

and 'bad' news are a total return of 0.78290 and -0.09804 and CARs of 0.81176 and -0.20009, respectively. The results are consequently different from zero and significant on the release date.

- The sample average $\overline{AR_{it}} = 0.00362$ and a total of $CAR_{it} = 0.61168$ are almost and significantly different from zero, respectively.
- The statistical results are not significant at $t_{AR} = 0.53127$ and $t_{CAR} = 1.11842$ for ARs and CARs, accordingly. However, are significantly different from zero on the release date, hence, the null hypothesis H_0*:* (AR_0| trading statements) = 0 is rejected.
- The results are not statistically significant an indication of no relationships between the post-trading statement release drift and the CARs over the [-2, +2)] window period surrounding actual earnings announcements. Therefore no relationship between the magnitude of the post-trading statement announcement drift and investor reaction to the actual earnings announcement.

The many points raised under reaction to trading statement releases are as much applicable to unexpected annual earnings announcements hence not repeated.

CHAPTER 7
CONCLUSION AND RECOMMENDATION

7.1 INTRODUCTION

After Cata (2015), this is the second investigation of the entire price formation process resulting from the effects of unexpected cautionary and annual earnings announcements on security market prices of the JSE listed companies. However, Kornik (2005) and Murie (2014) have investigated, separately, the effects of the accounting earnings (herein referred to unexpected annual earnings) and cautionary announcement (herein referred to as unexpected earnings or 'earnings surprise. ie Trading Statements releases) on the JSE security prices.

All of these studies examined the (if any) violation of the presumed JSE semi-strong form market efficiency by assessing or observing any initial market reaction to the news, from this any observably predictable return drift, ie direction and magnitude, and lastly, whether the traders and /or fund managers can exploit such predictability through devising investments or trading strategies. This empirical research study employed a two-factor model (Van Rensburg, 2002) to immediately measure whether the market sentiments of sizeable investors are fully reflected in the security price on the occurrence of the events of interests.

In testing for the effects of the information content of the security prices, the average CARs and their t-statistic test were found to be significantly different from the theoretical or expected zero AR, albeit, not statistically different from zero. The mean CARs are significantly different from zero, positive for 'good' new and negative on bad news in and around news publications of [-2; +2], [-2; +0], [-2; +1], [0; +1], [0; +2] and a drift of [1; +2] and [3; +5] window periods. This evidence of significant association suggests substantial investors reassess their beliefs/expectations on the occurrence and the size of 'earnings surprise and unexpected annual earnings. This finding violates the Efficient Markets Hypothesis (EMH) which assumes that security prices are instantly and fully reflective of all available information and that investors cannot use public information to consistently gain above-normal returns (Cata, 2014).

However, contrary to Murie's (2014) figure 7 and Cata's (2015) figure 1 the study found no suggestion that investors wait to determine the uncertainty regarding the specific reason for the change in earnings on the releases date to be alleviated via the announcement or publication of actual earnings announcements and therefore inconsistent with semi-strong form market efficiency. Firstly, Cata's (2015) figure 1 conclusion appears rather curious and

relies on weak evidence of observed drift based on unexpected earnings measures or models rather than the trading statement news in periods surrounding trading statement releases. Secondly, Murie (2014) did not investigate the entire price formation process and his [3;+60] post-release would have included the effects of earnings announcements considering on average it trails by approximately 9 trading days from the releases. What we know is that based on this study observation and Kornik's (2005) assertion that new information should be impounded into the security price within a week of the announcement. Thirdly, Murie (2014) correctly pointed out that unexpected earnings models or measures are not an information source to the market unlike trading statement releases and that an overlaps between the unexpected earnings models and CARs in the days before the release, cause false correlations and the results will have limited applicative use. Therefore, Cata (2014) would not have relied on the drift observed in unexpected earnings measures or models to reach such a conclusion. Lastly, this study already ascertained that there are other timelier sources of information, earnings announcements are timely since investors revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) percentage points before these events.

This study conclusion is that the t-statistic tests are not statistically significant at a 5% level of significance over the observation period, therefore, they cast doubt on the use of the initial response to consistently earn earnings above average normal returns. However, ARs and t-statistic tests are different from zero and this suggests that releases and earnings announcements do indeed convey information to which security prices react in the direction of the news.

7.2 VIEW TO FUND MANAGERS (Profitability by fund managers and traders)

The central insight into the efficient market hypothesis is that that a variety of forces impound available information into stock prices fast enough that arbitrage opportunities cannot be exploited systematically or strategically (Langevoort, 1992). The results of the study comes from an observation of the following unexpected earnings models or measures of [-2; +2], [-1; +0], [-2; +1], [0; +1], [+0; +2] and a drift of [1; +2] and [3; +5] window periods. The evidence gather is conclusive concerning the association of the information content generated through unexpected earnings disclosures and the average CARs and their t-statistic test found to be significantly different from the theoretical or expected zero. The outcome is statistically insignificant at a 5% significance level for traders and /or fund managers to devise investments

or trading strategies to exploit any potential gains from the price movement and even further no significant observed predictable returns.

Langevoort's (1992) view that earnings and dividends are inherently unpredictable resulting in an investor behavior of large guesswork and intuition an art partly explains the extent of investor reaction. What is unpredictable is the combination of the occurrence and extent of the event of interest, probably releases confirm the extent (ie >20%) but not the when and concerning earnings announcement is vice versa. The study already ascertains that there are other timelier sources of information and since investors revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 percent (Kornik, 2005) before these events. The timely part of the unexpected earnings stems from 15 to 10 (Ball and Brown, 1968 and /or 15 to 2 percent (Kornik, 2005). This situation can be exacerbated by the information leakage (discussed below), presuming that the pre-events 'normal' market revision or valuation stems from other timelier sources of information. The intention here is not to examine the traits (ie natural biases – consume information differently and addictively – develop an instinctive reaction in the presence of certain self-indulging indicators/signs biases) of an average individual investor, however, you are forced to consider it because it is reflected in security prices and the most unreliable predictor (i.e the investor must have known and acted rationally in 'purifying' market consensus).

The outcome of Foster et al. (1984) model 3 drift evidenced in table 4 suggest that an investor can devise a short trading strategy based on the 10 and 9 (i.e a buy) and 2 and 1 (i.e short sell) deciles over the five trading days in and around the release date. However, the intention of the study is not to ascertain the profitability of the events.

7.3 FURTHER RESEARCH INTEREST

7.3.1 A multi-factor vs two-factor APT model

In accordance with the empirical evidence by (Van Rensburg, 2002) a two-factor APT is a better factor analytic procedure that gives a true return generating process for a 'true' single stock market portfolio, i.e. an appropriate market proxy. The empirical evidence suggests investors revise their security valuations to an extent of 85 to 90 (Ball and Brown, 1968) and 85 to 98 (Kornik, 2005) before market events of interest provide for a compelling argument for an all-encompassing multi factor-model in the context of JSE. This study observed a security price movement in line with 'good' and 'bad' news portfolios on [-3; -1] and [-1; -1] releases and [-2; -1] announcements and Kornik (2005) observed a significant portion of the abnormal

return reaction occurs in the two days prior to the announcement date. Kornik (2005) suggests that either a substantial information leakage or simply legitimate information dissemination (i.e. other timelier sources of information) allows for investors to correctly adjust their earnings prediction through company analysis and /or interviews with management prior to unexpected earnings announcements. In the context of JSE, an alternative argument on legitimate information dissemination and other timelier sources of information before unexpected event news provides for a compelling reason for a multi factor-model which includes a metal index, interest rate (ie 5 or 10 years repo rate), inflation rate, currency, beta, economy (ie GDP growth), stock size (small vs large cap), leverage, unemployment rate, values such as price to book value or price-earnings (P/E) ratios, momentum (market biases – a big thing).

7.3.2 Market sentiments

The market appears bullish during the recent coinciding study periods of Murie (2014) and Cata (2015) namely from 2010 to 2013 and 2010 January to July 2014, respectively. Although the market sentiments appeared more bullish in Cata's (2015) and neutral in Murie's (2014) according to data analysed based on the composition of 'good' and 'bad' new portfolio. Whereas this study period market sentiments appear more bearish towards considering the later years and noting that the top 10 constitute 65 percent as of 31 January 2019 (FTSE Russell Factsheet, 2019. Wasserman (2018) identifies the market to be a bearish market indicating almost 65% of shares are now 20% below their recent peaks, and technically in a bear market. Perhaps the next study should consider periods starting from 2010 since the introduction of compulsory cautionary earnings announcements to date. This will hopefully provide for a more robust and conclusive outcome in an attempt to validate the JSE semi-strong form efficiency and whether investment and any observation and degree of information leakage and insider trading occurrence in JSE.

7.3.3 Management forecast

In this study, there were 14 out of 172 voluntary releases (i.e <20% earnings change), albeit not large, and the number might improve in the future, therefore, warrant a separate analysis. The data analysis provides for a suspicious reason for the voluntary management forecast disclosures considering the total return of 0.05739, expected return of 0.01027 and CARs of 0.04712 and only two bad news. The total actual return or price movement is 5.5 times more than the expected/market return, whereas, the total sample return (i.e 172 event dates) is only

0.9 times more. Could it be investors' trust more voluntarily disclosures as opposed to compulsory disclosures because of a belief that these disclosures are ‘non-public information’ willingly made public by the firm, therefore, more credible and trustworthy? Therefore, how reliable, relevant and accurate compulsory disclosures are?

7.3.2 The comparative period

JSE Limited Listings Requirements compel the issuer when satisfied that a reasonable degree of certainty exists that the financial results for the period to be reported upon next will differ by at least 20% except for those who publish quarterly results. A comparative period could be yearly or half-yearly or quarterly (voluntary), therefore, investors react differently based on the knowledge of the affected period. This could be an explanatory factor to the observed size of security price movement and /or return drift (or lack therefore) of CARs due to other timelier sources of information (i.e half yearly and /or quarterly). The proximity of the comparative period to the study event could then have reduced the informativeness of the annual report.

7.4 INSIDER TRADING

The security price movement in the direction of the release news appears to have been driven at most by information leakage and at least through simple information anticipation. For a ‘good’ news portfolio the evidence suggests that earnings change releases or information is well anticipated by the time of its arrival. The opposite is true for bad’ news portfolios, albeit, appear a random act, ie no logical explanation of why it did not follow the pattern of ‘good’ news. This random act extends to unexpected annual earnings results which are the exact opposite of trading statement releases. In general, for releases the security prices changes in a manner justified by the arrival of new market information as evidenced in the post-release drift.

APPENDICES

Appendix A - Summary of sample trading statements

Appendix A: Summary of Sample Trading Statement Events

No.	Date	Firm	Ticker	Earnings Change (Increase ↑ ↓ Decease)	Trading Statement Period		Release Type
					Report Type	Year End Period	
1	03-Feb-14	Absa Group Limited/Barclays Africa Group	BGA	↑	Yearly	Dec-13	Compulsory
2	10-Jul-14	Absa Group Limited/Barclays Africa Group	BGA	↑	Half yearly	Jun-14	Voluntary
3	22-Jan-14	Anglo American Platinum Ltd	AMS	↑	Yearly	Dec-13	Compulsory
4	14-Jul-14	Anglo American Platinum Ltd	AMS	↓	Half Yearly	Jun-14	Compulsory
5	01-Dec-14	Anglo American Platinum Ltd	AMS	↑	Yearly	Dec-14	Compulsory
6	25-Jan-16	Anglo American Platinum Ltd	AMS	↓	Yearly	Dec-15	Compulsory
7	12-Jul-16	Anglo American Platinum Ltd	AMS	↓	Half Yearly - Update	Jun-16	Compulsory
8	06-Feb-17	Anglo American Platinum Ltd	AMS	↑	Yearly - Update	Dec-16	Compulsory
9	18-Jul-17	Anglo American Platinum Ltd	AMS	↓	Half Yearly - Update	Jun-17	Compulsory
10	06-Feb-18	Anglo American Platinum Ltd	AMS	↑	Yearly - Update	Dec-17	Compulsory
11	16-Jul-18	Anglo American Platinum Ltd	AMS	↑	Half Yearly - Update	Jun-18	Compulsory
12	05-Feb-19	Anglo American Platinum Ltd	AMS	↑	Yearly - Update	Dec-18	Compulsory
13	22-Jul-16	AngloGold Ashanti	ANG	↑	Half Yearly	Jun-16	Compulsory
14	02-Feb-17	AngloGold Ashanti	ANG	↑	Yearly	Dec-16	Compulsory
15	01-Aug-17	AngloGold Ashanti	ANG	↓	Half Yearly	Jun-17	Compulsory
16	31-Jan-18	AngloGold Ashanti	ANG	↓	Yearly	Dec-17	Compulsory
17	02-Aug-18	AngloGold Ashanti	ANG	↑	Half Yearly	Jun-18	Compulsory
18	04-Feb-19	AngloGold Ashanti	ANG	↑	Yearly	Dec-18	Compulsory
19	29-Aug-14	Aspen Pharmacare Holdings	APN	↑	Yearly	Jun-14	Voluntary
20	26-Feb-15	Aspen Pharmacare Holdings	APN	↑	Half Yearly	Dec-14	Compulsory
21	28-Aug-15	Aspen Pharmacare Holdings	APN	↑	Yearly	Jun-15	Voluntary
22	23-Feb-16	Aspen Pharmacare Holdings	APN	↑	Half Yearly	Dec-15	Compulsory
23	07-Sep-16	Aspen Pharmacare Holdings	APN	↓	Yearly	Jun-16	Compulsory
24	01-Mar-17	Aspen Pharmacare Holdings	APN	↓	Half Yearly	Dec-16	Compulsory
25	30-Aug-17	Aspen Pharmacare Holdings	APN	↑	Yearly	Jun-17	Compulsory
26	15-Feb-18	Aspen Pharmacare Holdings	APN	↑	Half Yearly	Dec-17	Compulsory
27	04-Mar-15	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-15	Compulsory
28	04-Sep-15	Capitec Bank Hldgs Ltd	CPI	↑	Half Yearly	Aug-15	Compulsory
29	06-Sep-18	Capitec Bank Hldgs Ltd	CPI	↑	Half Yearly	Aug-18	Compulsory
30	05-Mar-14	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-14	Voluntary
31	08-Feb-16	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-16	Compulsory
32	07-Sep-16	Capitec Bank Hldgs Ltd	CPI	↑	Half Yearly	Aug-16	Voluntary
33	06-Mar-17	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-17	Voluntary
34	06-Sep-17	Capitec Bank Hldgs Ltd	CPI	↑	Half Yearly	Aug-17	Voluntary

35	05-Mar-18	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-18	Voluntary
36	04-Mar-19	Capitec Bank Hldgs Ltd	CPI	↑	Yearly	Feb-19	Voluntary
37	12-Feb-14	Discovery Ltd	DSY	↑	Half Yearly	Dec-13	Compulsory
38	27-Aug-14	Discovery Ltd	DSY	↑	Yearly	Jun-14	Compulsory
39	18-Feb-15	Discovery Ltd	DSY	↑	Half Yearly	Dec-14	Compulsory
40	10-Sep-15	Discovery Ltd	DSY	↓	Half Yearly	Dec-15	Compulsory
41	25-Feb-16	Discovery Ltd	DSY	↓	Yearly	Jun-16	Compulsory
42	25-Aug-16	Discovery Ltd	DSY	↑	Yearly	Jun-16	Compulsory
43	20-Feb-17	Discovery Ltd	DSY	↑	Half Yearly	Dec-16	Voluntary
44	31-Aug-17	Discovery Ltd	DSY	↑	Yearly	Jun-17	Compulsory
45	15-Feb-18	Discovery Ltd	DSY	↑	Half Yearly	Dec-17	Compulsory
46	23-Aug-18	Discovery Ltd	DSY	↑	Yearly	Jun-18	Compulsory
47	15-Feb-19	Discovery Ltd	DSY	↓	Half Yearly	Dec-18	Voluntary
48	25-Feb-14	First Rand Limited	FSR	↑	Half Yearly	Dec-13	Compulsory
49	02-Sep-14	First Rand Limited	FSR	↑	Yearly	Jun-14	Compulsory
50	22-Feb-19	First Rand Limited	FSR	↑	Half Yearly	Dec-18	Compulsory
51	19-Feb-14	Mondi Ltd	MNP	↑	Yearly	Dec-13	Compulsory
52	29-Jul-14	Mondi Ltd	MNP	↑	Half Yearly	Jun-14	Compulsory
53	10-Feb-15	Mondi Ltd	MNP	↑	Yearly	Dec-14	Compulsory
54	28-Jul-15	Mondi Ltd	MNP	↑	Half Yearly	Jun-15	Compulsory
55	16-Feb-16	Mondi Ltd	MNP	↑	Yearly	Dec-15	Compulsory
56	26-Jul-16	Mondi Ltd	MNP	↑	Half Yearly	Jun-16	Compulsory
57	15-Feb-19	Mondi Ltd	MNP	↑	Yearly	Dec-18	Compulsory
58	08-May-14	Mr Price Group	MRP	↑	Yearly	Mar-14	Compulsory
59	23-Oct-14	Mr Price Group	MRP	↑	Half Yearly	Sep-14	Compulsory
60	05-May-15	Mr Price Group	MRP	↑	Yearly	Mar-15	Compulsory
61	13-Nov-15	Mr Price Group	MRP	↑	Half Yearly	Sep-15	Compulsory
62	23-May-16	Mr Price Group	MRP	↑	Yearly	Apr-16	Compulsory
63	07-Nov-17	Mr Price Group	MRP	↑	Half Yearly	Sep-16	Compulsory
64	26-Apr-18	Mr Price Group	MRP	↑	Yearly	Mar-17	Compulsory
65	20-Feb-14	MTN Group	MTN	↑	Yearly	Dec-13	Compulsory
66	19-Feb-15	MTN Group	MTN	↑	Yearly	Dec-14	Compulsory
67	28-Jul-15	MTN Group	MTN	↓	Half Yearly	Jun-15	Compulsory
68	18-Feb-16	MTN Group	MTN	↓	Yearly	Dec-15	Compulsory
69	04-Aug-16	MTN Group	MTN	↓	Half Yearly - Update	Jun-16	Compulsory
70	27-Feb-17	MTN Group	MTN	↓	Yearly	Dec-16	Compulsory
71	27-Jul-17	MTN Group	MTN	↑	Half Yearly - Update	Jun-17	Compulsory
72	02-Mar-18	MTN Group	MTN	↑	Yearly - Update	Dec-17	Compulsory
73	28-Feb-19	MTN Group	MTN	↑	Yearly - Update	Dec-18	Compulsory
74	14-Nov-14	Naspers	NPN	↓	Half Yearly	Sep-14	Compulsory

75	17-Jun-15	Naspers	NPN	↑	Yearly	Mar-15	Compulsory
76	20-Nov-15	Naspers	NPN	↑	Half Yearly	Sep-15	Compulsory
77	15-Jun-16	Naspers	NPN	↓	Yearly	Mar-16	Compulsory
78	18-Nov-16	Naspers	NPN	↓	Half Yearly	Sep-16	Compulsory
79	14-Jun-17	Naspers	NPN	↑	Yearly	Mar-17	Compulsory
80	17-Nov-17	Naspers	NPN	↑	Half Yearly	Sep-17	Compulsory
81	13-Jun-18	Naspers	NPN	↑	Yearly	Mar-18	Compulsory
82	19-Nov-18	Naspers	NPN	↑	Half Yearly	Sep-18	Compulsory
83	26-Jul-18	Nedbank Group	NBK	↑	Half Yearly	Jun-18	Compulsory
84	09-Oct-14	PSG Group Limited	PSG	↑	Half Yearly	Aug-14	Compulsory
85	10-Apr-15	PSG Group Limited	PSG	↑	Yearly	Feb-15	Compulsory
86	08-Oct-15	PSG Group Limited	PSG	↑	Half Yearly	Aug-15	Compulsory
87	15-Apr-16	PSG Group Limited	PSG	↓	Yearly	Feb-16	Compulsory
88	12-Apr-17	PSG Group Limited	PSG	↑	Yearly	Feb-17	Compulsory
89	06-Oct-17	PSG Group Limited	PSG	↓	Half Yearly	Aug-17	Compulsory
90	12-Oct-18	PSG Group Limited	PSG	↑	Half Yearly	Aug-18	Compulsory
91	07-Mar-14	Remgro	REM	↑	Half Yearly	Dec-13	Compulsory
92	08-Sep-14	Remgro	REM	↑	Yearly	Jun-14	Compulsory
93	08-Sep-15	Remgro	REM	↑	Yearly	Jun-15	Compulsory
94	12-Sep-16	Remgro	REM	↓	Yearly	Jun-16	Compulsory
95	07-Mar-17	Remgro	REM	↑	Half Yearly	Dec-16	Compulsory
96	11-Sep-17	Remgro	REM	↑	Yearly	Jun-17	Compulsory
97	25-Feb-14	RMB Holdings	RMH	↑	Half Yearly	Dec-13	Compulsory
98	02-Sep-14	RMB Holdings	RMH	↑	Yearly	Jun-14	Compulsory
99	10-Sep-15	RMB Holdings	RMH	↑	Yearly	Jun-15	Compulsory
100	26-Feb-19	RMB Holdings	RMH	↑	Half Yearly	Dec-18	Compulsory
101	10-Feb-14	Sanlam	SLM	↑	Yearly	Dec-13	Compulsory
102	15-Aug-14	Sanlam	SLM	↑	Half Yearly	Jun-14	Compulsory
103	14-Feb-14	Sasol	SOL	↑	Half Yearly	Dec-13	Compulsory
104	11-Aug-14	Sasol	SOL	↑	Yearly	Jun-14	Compulsory
105	06-Feb-15	Sasol	SOL	↑	Half Yearly	Dec-14	Compulsory
106	07-Aug-15	Sasol	SOL	↓	Yearly	Jun-15	Compulsory
107	28-Jan-16	Sasol	SOL	↓	Half Yearly	Dec-15	Compulsory
108	06-Jun-16	Sasol	SOL	↓	Yearly	Jun-16	Compulsory
109	26-Jan-17	Sasol	SOL	↑	Half Yearly	Dec-16	Compulsory
110	25-Jul-17	Sasol	SOL	↑	Yearly	Jun-17	Compulsory
111	23-Jan-18	Sasol	SOL	↑	Half Yearly	Dec-17	Compulsory
112	20-Jul-18	Sasol	SOL	↓	Yearly	Jun-18	Compulsory
113	08-Feb-19	Sasol	SOL	↑	Half Yearly - Update	Dec-18	Compulsory
114	29-Jan-19	Shoprite	SHP	↓	Half Yearly	Dec-18	Compulsory
115	25-Feb-15	Standard Bank Group	SBK	↑	Yearly - Update	Dec-14	Voluntary
116	28-Jul-15	Standard Bank Group	SBK	↑	Half Yearly	Jun-15	Compulsory
117	24-Feb-16	Standard Bank Group	SBK	↑	Yearly	Dec-15	Compulsory
118	27-Oct-14	The Foschini Group Ltd	FG-TFGP	↑	Half Yearly	Sep-14	Compulsory

119	09-May-16	The Foschini Group Ltd	FG-TFGP	↑	Yearly	Mar-16	Compulsory
120	06-May-15	The Spar Group	SPP	↑	Half Yearly	Mar-16	Compulsory
121	07-Nov-16	The Spar Group	SPP	↑	Yearly	Sep-16	Compulsory
122	15-May-14	Tiger Brands	TBS	↑	Half Yearly	Mar-14	Compulsory
123	05-Nov-14	Tiger Brands	TBS	↓	Yearly	Sep-14	Compulsory
124	14-Apr-15	Tiger Brands	TBS	↓	Half Yearly	Mar-15	Compulsory
125	03-May-16	Tiger Brands	TBS	↑	Half Yearly	Mar-16	Compulsory
126	28-Oct-16	Tiger Brands	TBS	↑	Yearly	Sep-16	Compulsory
127	09-Nov-18	Tiger Brands	TBS	↑	Yearly	Sep-18	Compulsory
128	27-Jan-16	Truworths International	TRU	↑	Half Yearly	Dec-15	Compulsory
129	14-Jan-16	Woolworths Holdings	WHL	↑	Half Yearly	Dec-15	Compulsory
130	14-Jul-16	Woolworths Holdings	WHL	↑	Yearly	Jun-16	Compulsory
131	12-Jan-17	Woolworths Holdings	WHL	↑	Half Yearly	Dec-16	Compulsory
132	13-Jul-17	Woolworths Holdings	WHL	↑	Yearly	Jun-17	Compulsory
133	17-May-18	Woolworths Holdings	WHL	↓	Yearly	Jun-18	Compulsory
134	19-Jul-18	Woolworths Holdings	WHL	↓	Yearly - Update	Jun-18	Compulsory
135	17-Jan-19	Woolworths Holdings	WHL	↑	Half Yearly - Update	Dec-18	Compulsory
136	17-Jan-14	Kumba Iron Ore	KIO	↑	Yearly	Dec-13	Compulsory
137	11-Jul-14	Kumba Iron Ore	KIO	↓	Half Yearly	Jun-14	Compulsory
138	23-Jan-15	Kumba Iron Ore	KIO	↓	Yearly - Update	Dec-14	Compulsory
139	15-Jul-15	Kumba Iron Ore	KIO	↓	Half Yearly - Update	Jun-15	Compulsory
140	02-Feb-16	Kumba Iron Ore	KIO	↓	Yearly - Update	Dec-15	Compulsory
141	14-Jul-16	Kumba Iron Ore	KIO	↑	Half Yearly	Jun-16	Compulsory
142	25-Jan-17	Kumba Iron Ore	KIO	↑	Yearly - Update	Dec-16	Compulsory
143	14-Jul-17	Kumba Iron Ore	KIO	↑	Half Yearly - Update	Jun-17	Compulsory
144	09-Feb-18	Kumba Iron Ore	KIO	↑	Yearly	Dec-17	Compulsory
145	19-Jul-18	Kumba Iron Ore	KIO	↓	Half Yearly - Update	Jun-18	Compulsory
146	24-Jan-19	Kumba Iron Ore	KIO	↓	Yearly	Dec-18	Compulsory
147	15-Aug-14	Impala Platinum Holdings	IMP	↓	Yearly - Update	Jun-14	Compulsory
148	16-Feb-15	Impala Platinum Holdings	IMP	↓	Half Yearly - Update	Dec-14	Compulsory
149	24-Aug-15	Impala Platinum Holdings	IMP	↓	Yearly	Jun-15	Compulsory
150	15-Feb-16	Impala Platinum Holdings	IMP	↓	Half Yearly	Dec-15	Compulsory
151	22-Aug-16	Impala Platinum Holdings	IMP	↓	Yearly	Jun-16	Compulsory
152	13-Feb-17	Impala Platinum Holdings	IMP	↓	Half Yearly	Dec-16	Compulsory
153	22-Aug-17	Impala Platinum Holdings	IMP	↓	Yearly	Jun-17	Compulsory
154	19-Feb-18	Impala Platinum Holdings	IMP	↑	Half Yearly	Dec-17	Compulsory
155	20-Aug-18	Impala Platinum Holdings	IMP	↓	Yearly	Jun-18	Compulsory
156	18-Feb-19	Impala Platinum Holdings	IMP	↑	Half Yearly - Update	Dec-18	Compulsory
157	09-Feb-15	Imperial Logistics Limited	IPL	↓	Half Yearly	Dec-14	Voluntary
158	24-Jan-17	Imperial Logistics Limited	IPL	↓	Half Yearly	Dec-16	Compulsory
159	07-Aug-17	Imperial Logistics Limited	IPL	↓	Yearly	Jun-17	Voluntary
160	03-Aug-18	Imperial Logistics Limited	IPL	↑	Yearly	Jun-18	Compulsory
161	05-Feb-19	Imperial Logistics Limited	IPL	↑	Half Yearly	Dec-18	Compulsory
162	27-Feb-14	Exxaro Resources	EXX	↓	Yearly - Update	Dec-13	Compulsory
163	30-Jul-14	Exxaro Resources	EXX	↓	Half Yearly - Update	Jun-14	Compulsory

164	20-Feb-15	Exxaro Resources	EXX	↓	Yearly	Dec-14	Compulsory
165	07-Aug-15	Exxaro Resources	EXX	↓	Half Yearly - Update	Jun-15	Compulsory
166	25-Feb-16	Exxaro Resources	EXX	↓	Yearly - Update	Dec-15	Compulsory
167	05-Aug-16	Exxaro Resources	EXX	↑	Half Yearly	Jun-16	Compulsory
168	02-Mar-17	Exxaro Resources	EXX	↓	Yearly	Dec-16	Compulsory
169	11-Aug-17	Exxaro Resources	EXX	↓	Half Yearly	Jun-17	Compulsory
170	06-Mar-18	Exxaro Resources	EXX	↓	Yearly - Update	Dec-17	Compulsory
171	08-Aug-18	Exxaro Resources	EXX	↑	Half Yearly	Jun-18	Compulsory
172	05-Mar-19	Exxaro Resources	EXX	↑	Yearly	Dec-18	Compulsory

Appendix B: CARs of positive trading statement firms

KIO – 2017/01/25

MRP – 2015/11/13 (Intra-day)

KIO – 2016/01/23 (intra-day)

APN 2018/02/15

MRP 2016/05/23 (Intra-day)

CPI 2016/02/08 (Intra-day)

Appendix C: CARs of negative trading statement firms

KIO – 2016/02/02 (Intra-day)

TBS – 2015/04/15 (Intra-day)

AMS – 2017/07/18 (Intra-day)

KIO – 2019/01/24

KIO – 2015/07/15 (Intra-day; +ve)

SOL – 2016/06/06 (-ve)

SHP – 2019/01/29 (-ve)

MTN – 2016/02/18 (-ve)

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